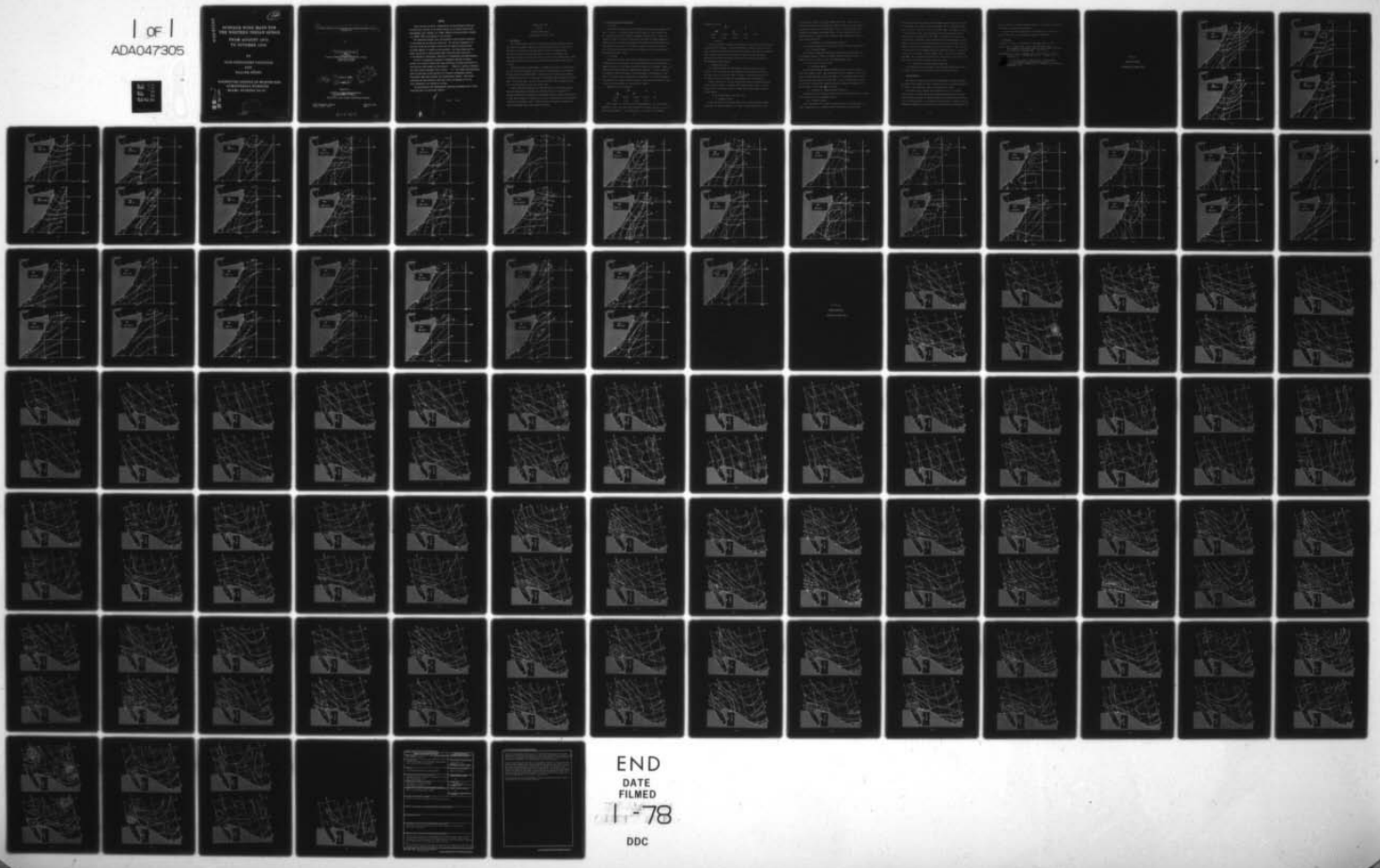
AD-A047 305 ROSENSTIEL SCHOOL OF MARINE AND ATMOSPHERIC SCIENCE --ETC F/G 4/2
SURFACE WIND MAPS FOR THE WESTERN INDIAN OCEAN FROM AUGUST 1975--ETC(U)
OCT 77 J PARTAGAS, W DUING N00014-75-C-0173

UNCLASSIFIED NL

1 OF 1
ADA047305



END
DATE FILMED
1-78
DDC

12 B.S.

# SURFACE WIND MAPS FOR THE WESTERN INDIAN OCEAN

# FROM AUGUST 1975 TO OCTOBER 1976

BY

JOSE-FERNANDEZ PARTAGAS

AND

WALTER DÜING

ROSENSTIEL SCHOOL OF MARINE AND ATMOSPHERIC SCIENCES
MIAMI, FLORIDA 33149

(6) SURFACE WIND MAPS FOR THE WESTERN INDIAN OCEAN FROM AUGUST 1975 TO OCTOBER 1976.

by

(10) Jose Fernandez Partagas
and
Walter Düing
Rosenstiel School of Marine & Atmospheric Science
University of Miami
Miami, Florida 33149



(12) 88p.

(9) TECHNICAL REPORT.

(11) October, 1977

Submitted to

The Office of Naval Research Contract
(15) No. N00014-75-C-0173

Approved for public release; distribution unlimited

4600 Rickenbacker Causeway
Miami, Florida 33149

William W. Hay
Dean

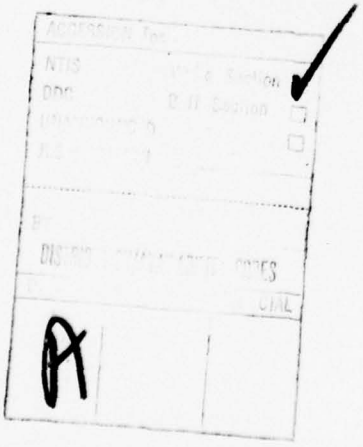
## PREFACE

During the past few years, oceanographers and meteorologists alike have refocused their interest on the monsoon regions of the western Indian Ocean. Oceanographic pilot programs (e.g. INDEX, CINCWIO) and meteorological programs (e.g. MONEX, FGGE) are evidences of this interest.

The interaction between ocean and atmosphere is particularly pronounced in the Arabian Sea and along its boundaries. The low-level atmospheric jet over East Africa and the Somali Current with its adjacent upwelling areas are prime examples of coupled air-sea phenomena. The large signals and the annual periodicity of these processes make them particularly attractive to the geophysical researchers, especially to oceanographers and meteorologists.

As part of studying the influence of atmospheric motions on oceanic motions in the western Indian Ocean, maps describing the surface wind field for that area have been prepared at the Universi[illegible] Miami for a period of fourteen and a half months (mid-August 1975 to Octob[illegible]6). The surface wind description given by these maps is more suitable for concurrent oceanographic studies than monthly mean winds obtained from climatological atlases: year-to-year variations and high horizontal resolution, which are averaged out in the atlas information, are retained on our maps.

For meteorologists and oceanographers preparing experimental work in 1979, these maps may be of particular interest.




J.F.P. W. D.

# SURFACE WIND MAPS

# FOR THE

# WESTERN INDIAN OCEAN

# (August 1975 to October 1976)

## 1. Introduction

This report presents surface wind maps which have been specially prepared for areas of the western Indian Ocean during mid-August 1975 to October 1976. The maps are based upon an unusually large collection of wind data and, therefore, describe the surface wind field in a much more realistic and more detailed manner than operational weather charts for the Indian Ocean. These considerations justify the effort of putting together the maps in the form of a report.

Surface wind maps from mid-August to December 1975 in Part A of this report are for a marine area bounded by the equator, the 12°N parallel, the northeast African coast and the 60°E meridian. The area covered by the maps for January to October 1976 in Part B of this report is much larger than the area of the 1975 maps. For the 1976 maps, the area covers from 10°S to 16°N latitude and from about the 65°E meridian to the east African coast.

Surface wind data composited over three day periods are used on each map. This data compositing is necessary because daily data are too sparse for a reliable wind analysis; compositing is permissible because no major wind variation of less than three days is expected to occur over the map areas at the large-scale (Krishnamurti and Bhalme, 1976). Composited data on the maps are analyzed by using a streamline-isotach wind analysis technique.

2. Wind data and analysis procedure

a) Sources

Sources for the wind data used on the maps for mid-August to December 1975 are: 1) the U. S. National Climatic Center, Asheville, North Carolina and 2) the East African Meteorological Department, Nairobi, Kenya. Source (1) provides a large collection of wind reports from ships (at ship's anemometer level); source (2) provides wind reports from coastal and island stations and a few additional ship reports. In addition to data from sources (1) and (2), the 1976 maps contain some ship reports provided by the India Meteorological Department, New Delhi, India.

b) Plotting

Wind data are plotted on three-day composite maps by following the standard convention used in Meteorology. The surface wind direction is indicated by a segment pointing in the direction towards which the wind is blowing. Flags, full barbs and half-barbs along the segment denote wind speed. A flag is assigned to represent a 50-kt wind speed; a 10-kt wind speed is represented by a full barb. A 5-kt wind speed is represented by a half-barb; a 1 or 2-kt wind speed is represented by a segment without any barb. Calm reports are plotted as small circles and variable winds are represented by a small v.

Examples of wind plotting are:

| SE wind | NE wind | SW wind | N wind | Calm |
|---|---|---|---|---|
| 50kt | 25 kt | 30 kt | 5 kt | |

These examples are valid for the Northern Hemisphere. For the Southern Hemisphere, flags, full barbs and half-barbs are oriented opposite to those for the Northern Hemisphere. The examples above, if plotted in the Southern

Hemisphere would be:

| SE wind | NE wind | SW wind | N wind | Calm |
|---|---|---|---|---|
| 50 kt | 25 kt | 30 kt | 5 kt | |

c) Analysis

Wind data plotted on the maps are subjectively analyzed by using a streamline-isotach analysis technique. Free-hand streamlines (arrowed, thin lines on the maps) are drawn by following the wind direction shown by the three-day composited data; isotachs (heavy lines on the maps) are drawn to denote wind speed. Therefore, the surface wind field is described (in direction and speed) by the streamline-isotach analysis.

3. Surface wind field

The surface wind field is discussed here only in terms of its major features. This is because the time variation of the surface wind field at the large-scale is, in general, slow. Therefore, a detailed description of the surface wind field as shown by each individual map is unnecessary.

General characteristics of the surface wind field are discussed separately for the period mid-August to December 1975 (based on maps in Part A of this report) and for the period January to October 1976 (based on maps in Part B of this report).

a) Period mid-August to December, 1975

i) Southwest monsoon

As the map series starts by mid-August 1975, a strong southwest monsoon is present. As expected (Ramage et al, 1972), a wind maximum (about 35 kt)

is found in the vicinity of Socotra Island (12°N, 54°E). Winds turn out to be quite persistent in direction but exhibit a tendency for some variation in speed at a time-scale of a forthnight or so; this variation agrees with findings by Krishnamurti and Bhalme (1976). By late September 1975, the southwest monsoon is found to decay and rather light southwesterly winds are found by mid-October 1975.

ii) Southwest to northeast monsoon transition

This transition gradually occurs in late October and early November 1975.

iii) Northeast monsoon

The northeast monsoon gets definitely established by mid-November 1975. The northeast monsoon is found to be weaker than the southwest monsoon. No winds over 25 kt are found to occur in November-December 1975.

b) Period January to October 1976

i) Northeast monsoon

The 1975-1976 northeast monsoon continues to affect the area during the first three months of 1976. The northeasterly flow is frequently found to turn into a northwesterly flow south of the equator. The northeast monsoon flow is found to become more easterly in March 1976. A few of the maps show tropical cyclones near latitude 10°S; cyclone positions are based on De Angelis (1977) and are denoted by the symbol ⍼ on the maps.

ii) Northeast to southwest monsoon transition

Southeasterly flow is found over the first half of April 1976 as a transition from the northeast to the southwest monsoon.

iii) Southwest monsoon

First indications of the summer southwest monsoon occur around April 20, 1976. Subsequently, the southwest monsoon shows gradually intensifying

characteristics which may permit the 1976 summer monsoon onset to be classed in the gradual onset category (Fieux and Stommel, 1977). The surface wind speed is found to reach about 35 kt by the end of May. The monsoon is found to remain strong in June, July and August; 40 kt wind maxima are noted on several maps in late June and in July 1976. No tendency for a wind speed variation with a forthnight period is detected in the 1976 southwest monsoon analysis. Some decay of the southwest monsoon is found in September and the monsoon is found to be weak during the first half of October. This indicates an earlier decay of the southwest monsoon in 1976 than in 1975. Two tropical cyclones occur in October 1976 (De Angelis, 1977): one of them (denoted by symbol ) over the Arabian Sea near Socotra Island and the other south of the equator near the Seychelles Islands (about $5^{o}$S, $55^{o}$E).

iv) Southwest to northeast monsoon transition

The transition from the southwest to the northeast monsoon starts late in October 1976 and is still underway at the end of the map series.

Acknowledgements

The authors of this report gratefully acknowledge the financial support provided by Grant N00014-75-C 0173, "Transient Processes in Ocean Currents" of the Office of Naval Research (ONR) to the University of Miami.

The authors wish to express their gratitude to the U. S. National Climatic Center, the East African Meteorological Department and the Indian Meteorological Department for making available the invaluable data collection used in the map analysis. The cooperation received from J. Findlater (United Kingdom Meteorological Office and East African Meteorological Department) and

Henry F. Diaz (U. S. National Climatic Center) in the process of obtaining these data is particularly appreciated.

Lyn Ferlo and Lynn Zakevich-Gheer are responsible for drafting the maps and Nancy Dale is responsible for typing the manuscript.

## References

De Angelis, D., 1977: Hurricane Alley. Mar. Wea. Log., 21, 16-19.

Fieux, M. and H. Stommel, 1977: Onset of the southwest monsoon over the Arabian Sea from marine reports of surface winds: structure and variability. Mon. Wea. Rev., 105, 231-236.

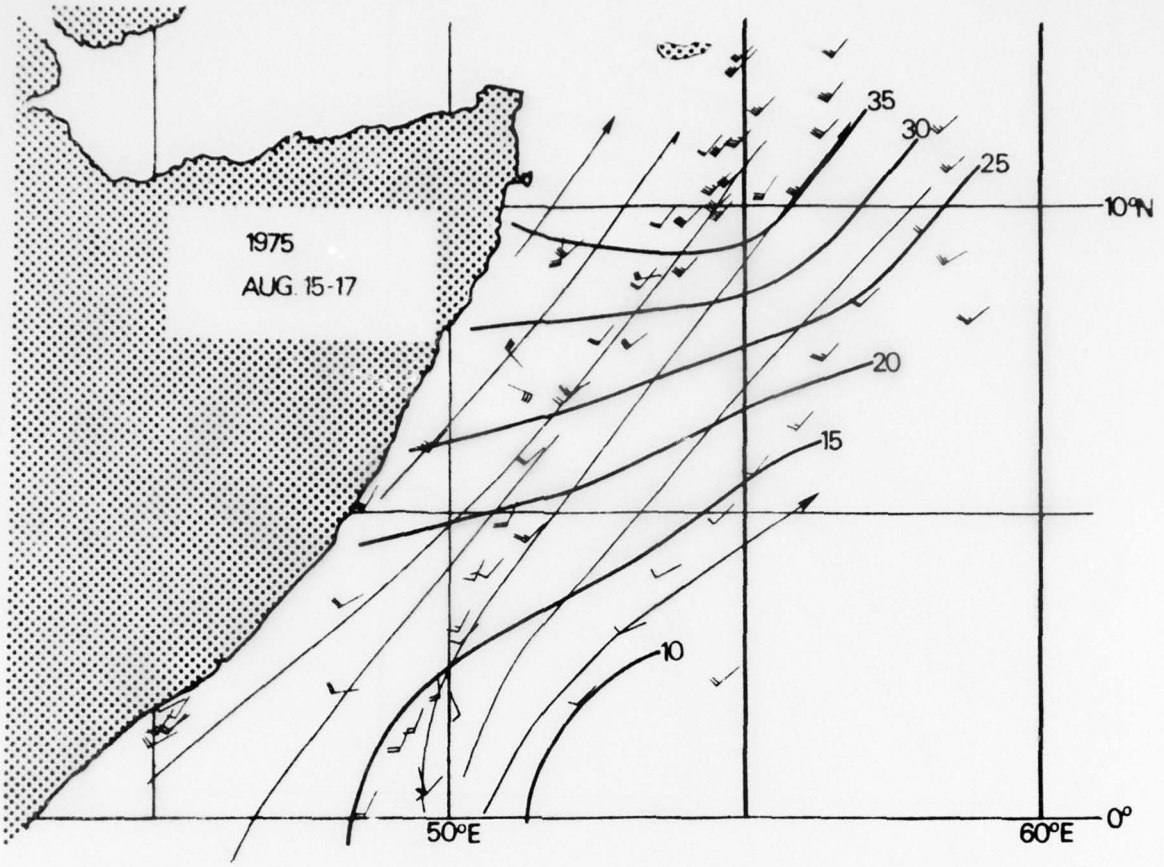
Krishnamurti, T. N. and H. N. Bhalme, 1976: Oscillations of a monsoon system. Part I. Observational aspects. J. Atmos. Sci., 33, 1937-1954.

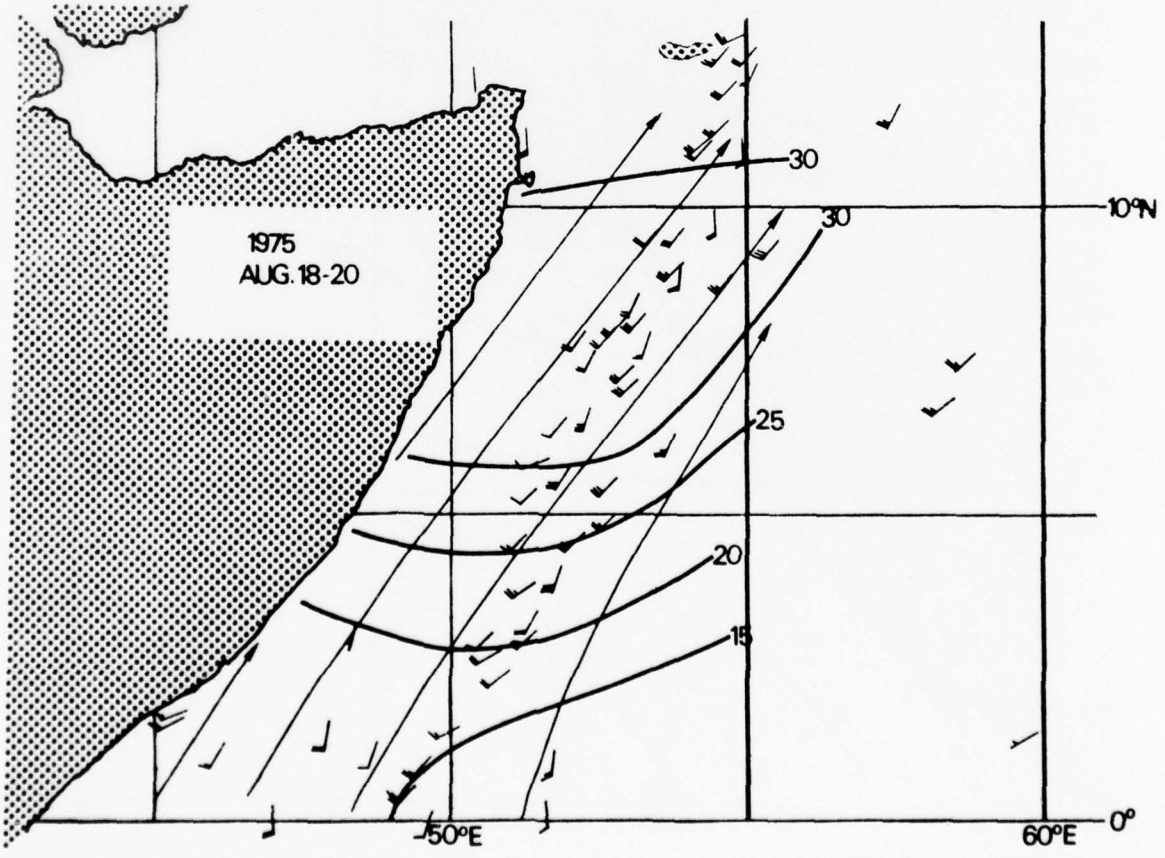
R[illegible], C. S., F. R. Miller and C. Jefferies, 1972: Meteorological Atlas of the International Indian Ocean Expedition. Vol. I. The surface climate of 1963 and 1964. National Science Foundation, Washington, D. C.

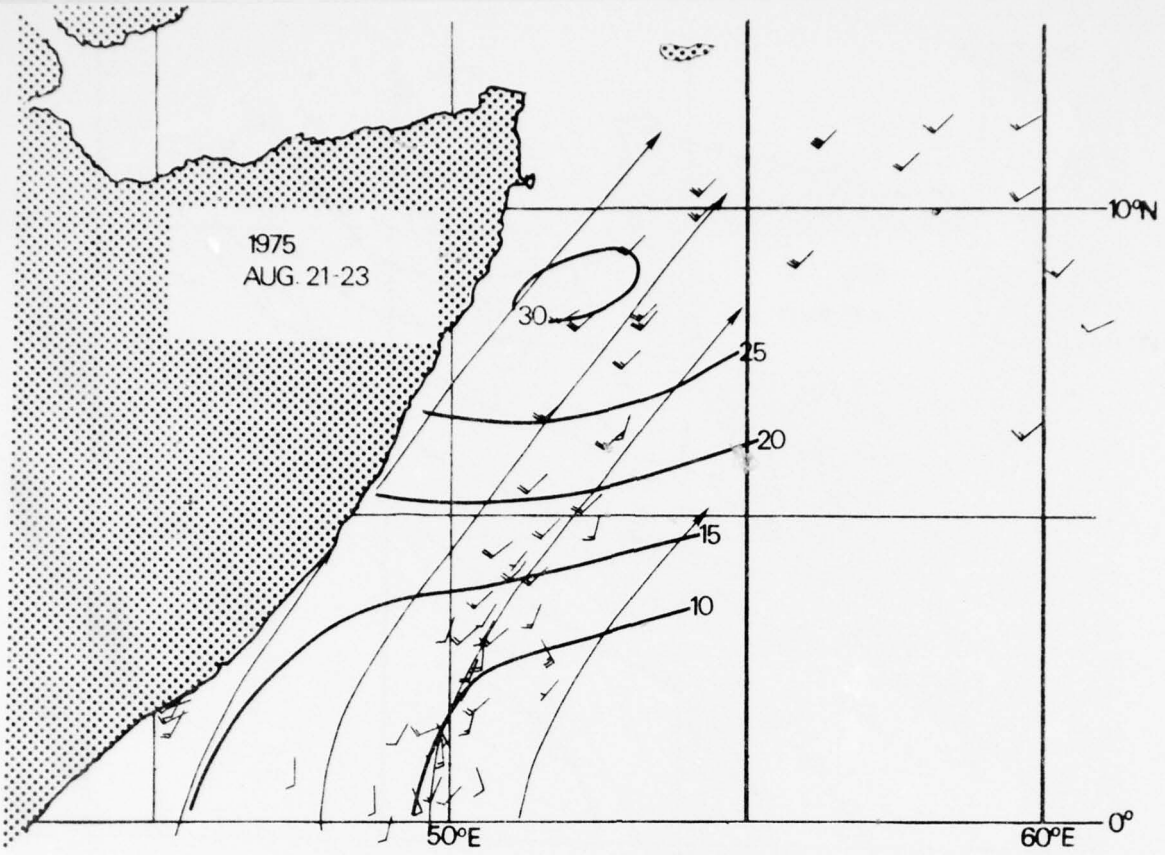
# P A R T A

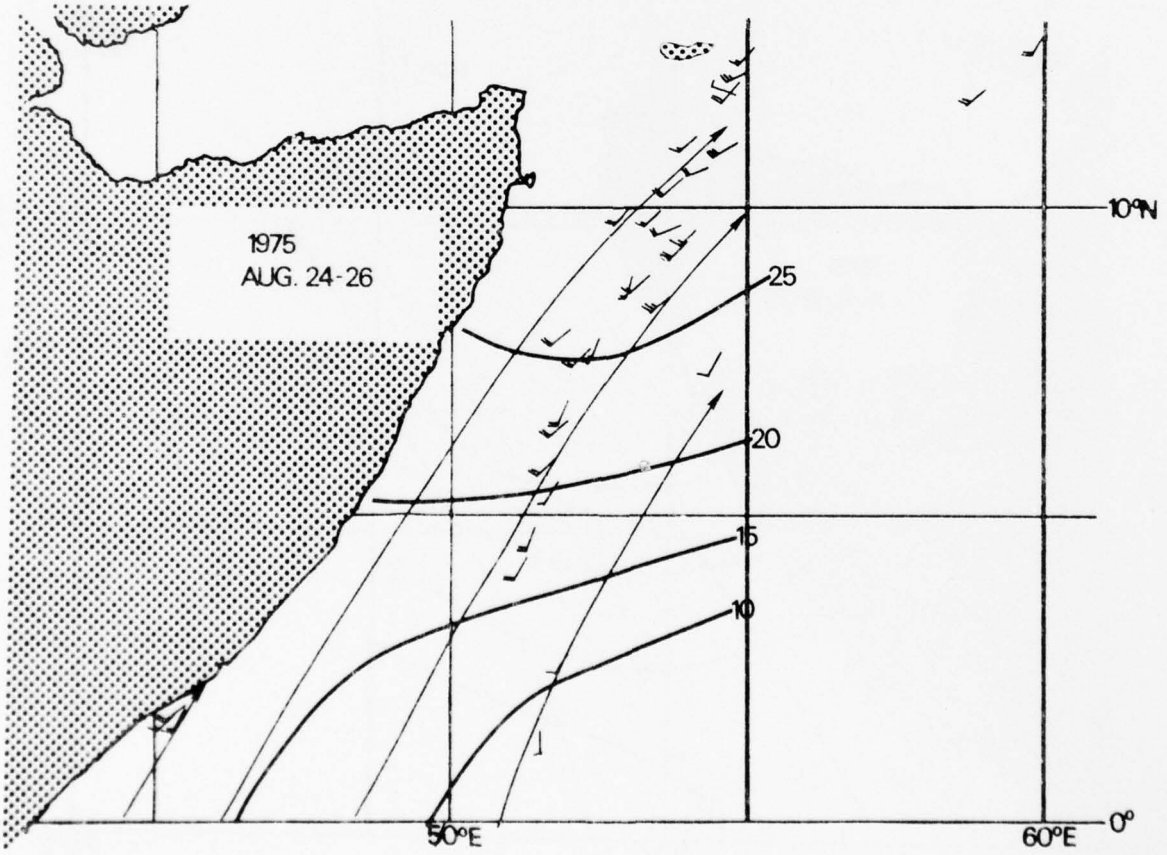
## SURFACE WIND MAPS

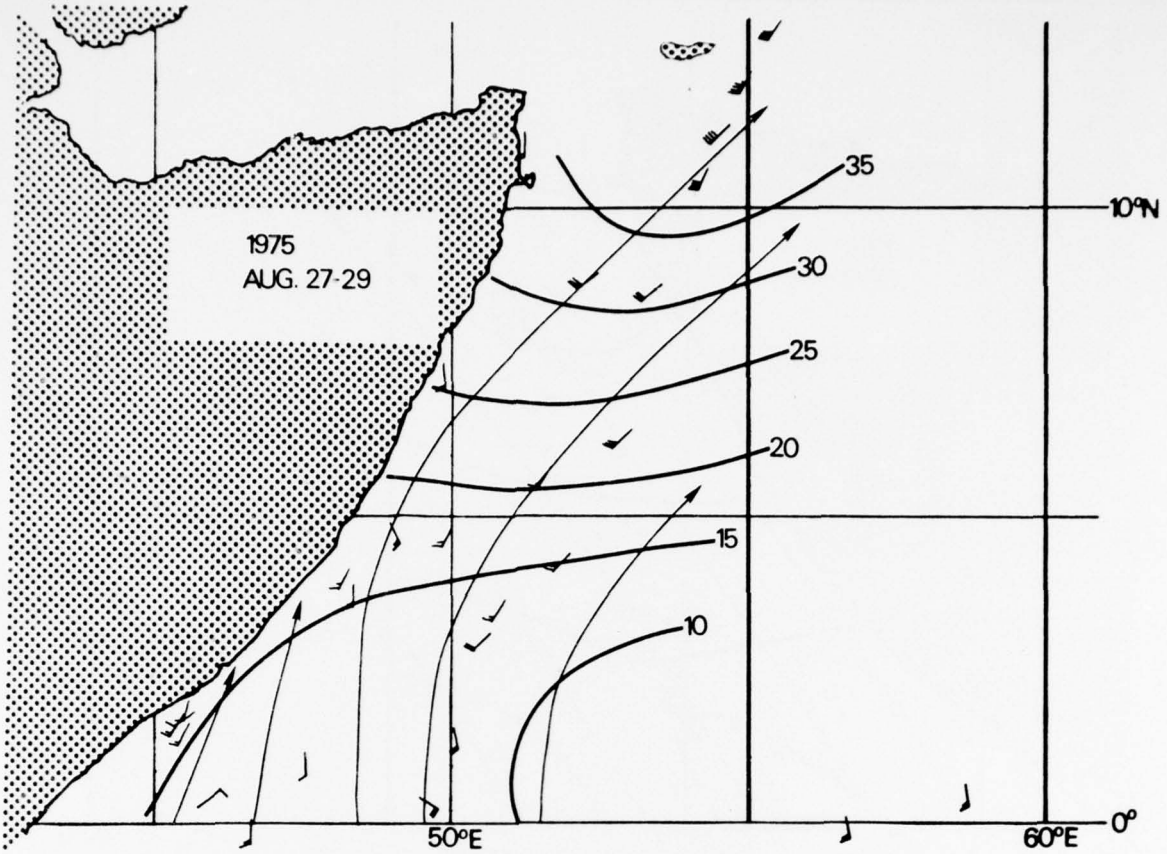
## Mid-August to December 1975

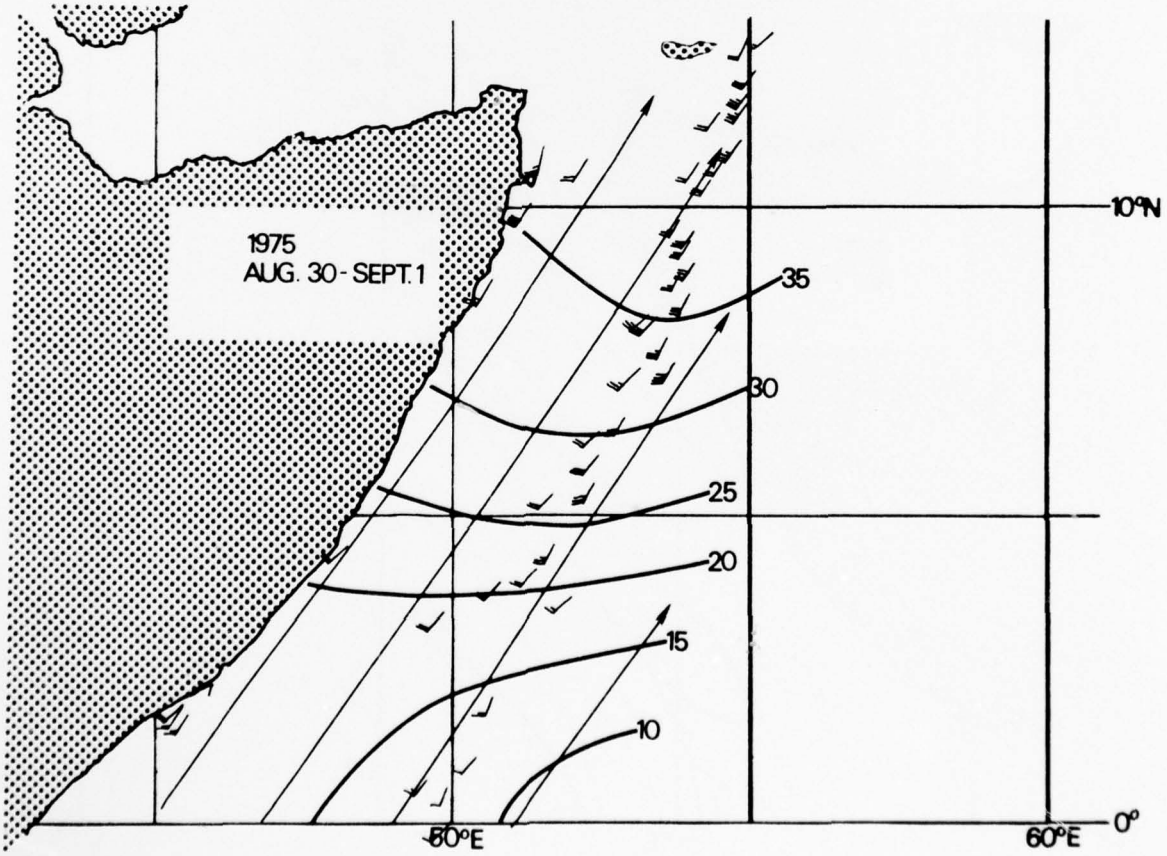

1975
AUG. 15-17
35
30
25
20
15
10
10°N
0°
50°E
60°E

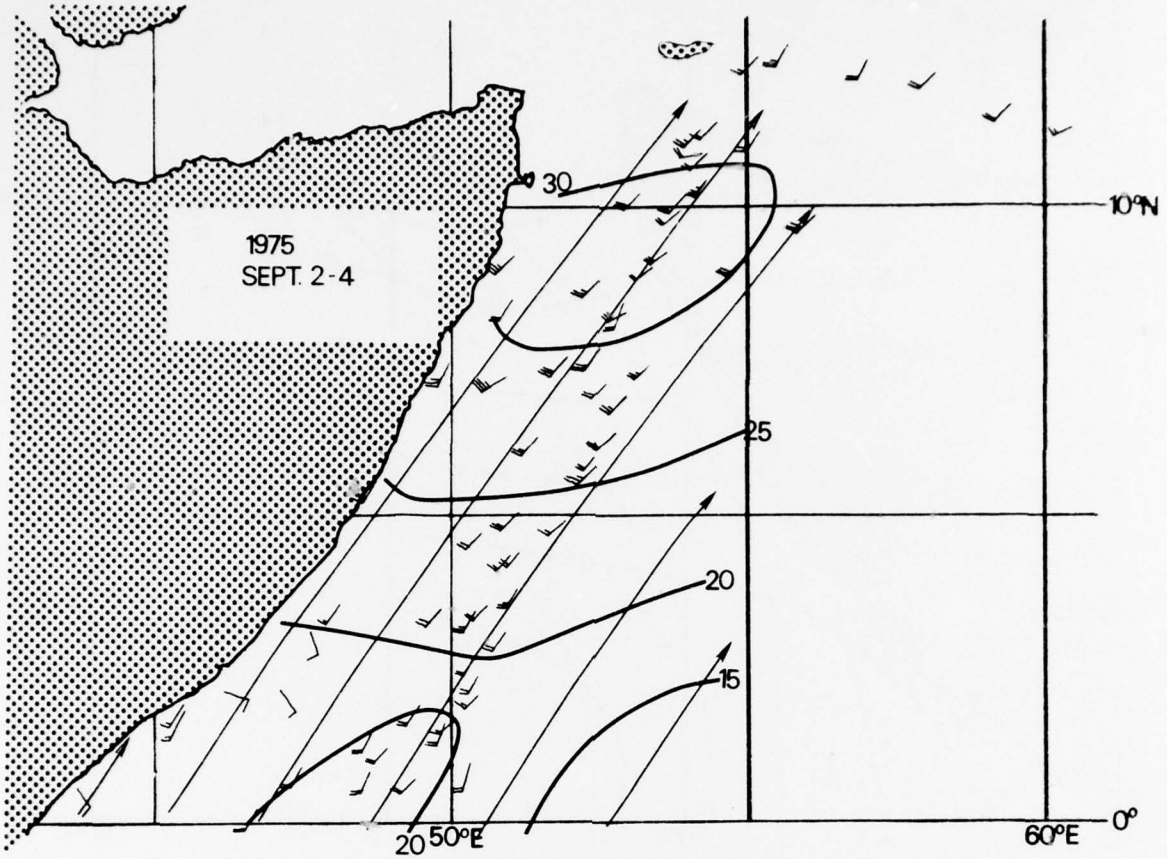

1975
AUG. 18-20
30
30
25
20
15
10°N
0°
50°E
60°E

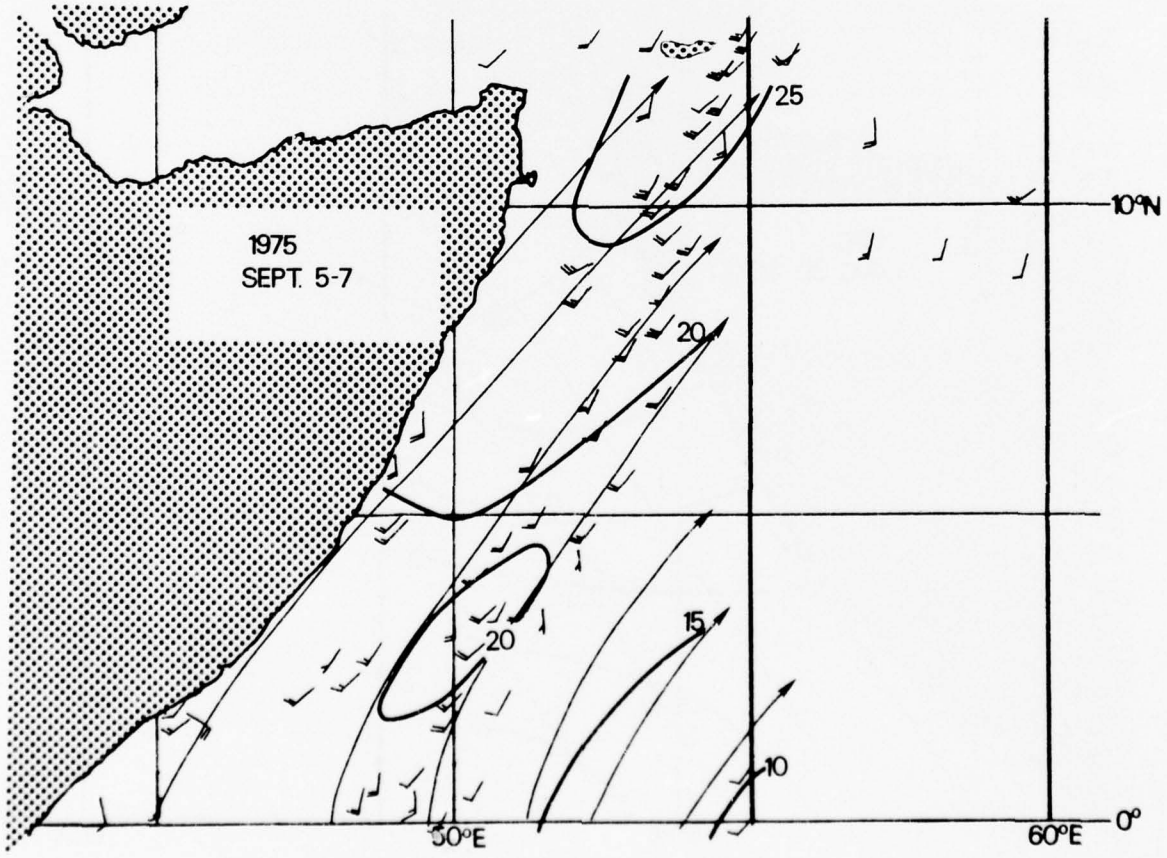

1975
AUG. 21-23
30
25
20
15
10
10°N
0°
50°E
60°E

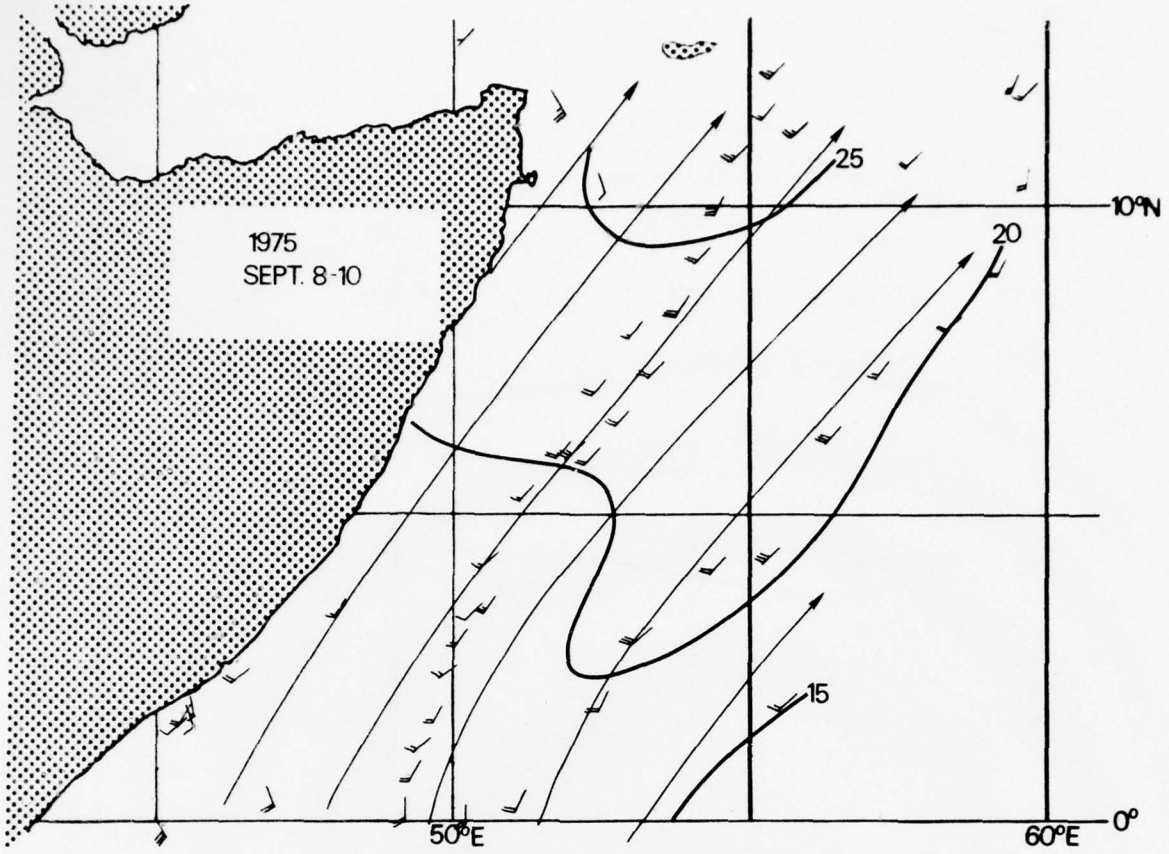

1975
AUG. 24-26
25
20
15
10
10°N
0°
50°E
60°E

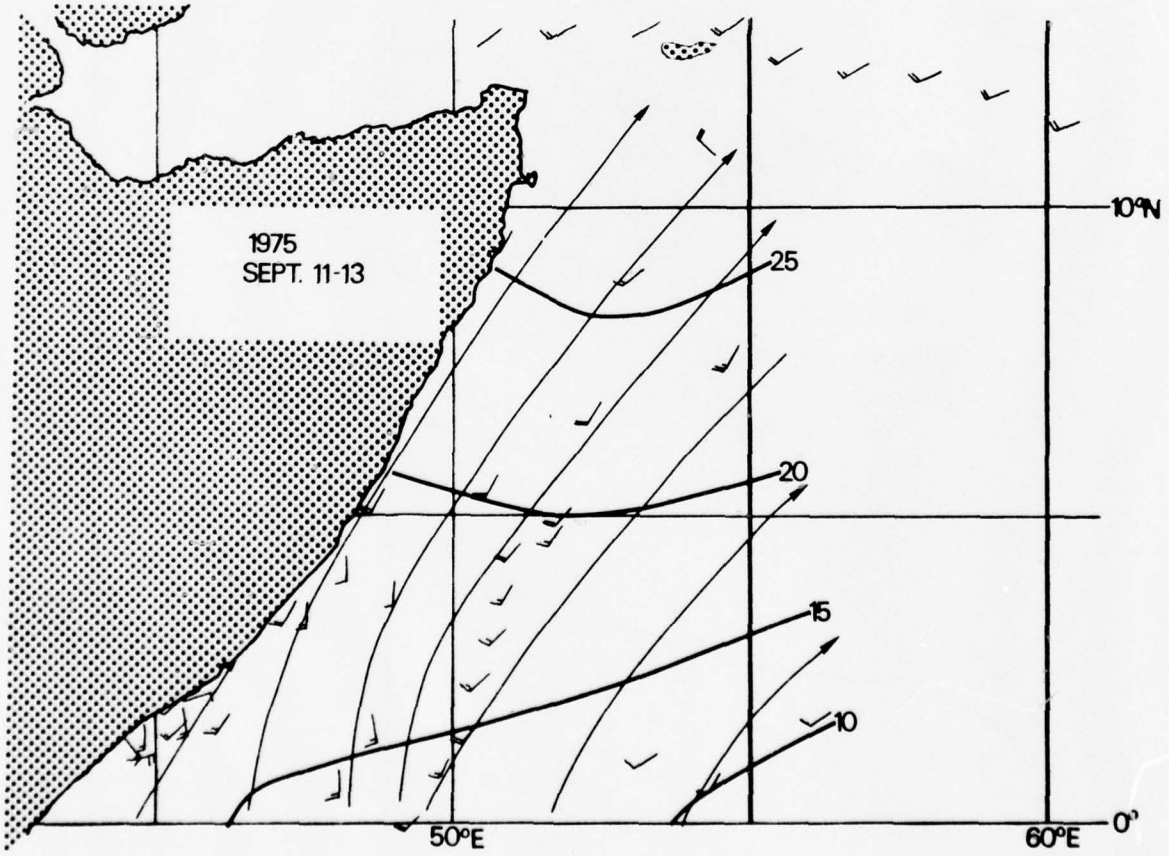

1975
AUG. 27-29
35
30
25
20
15
10
10°N
0°
50°E
60°E

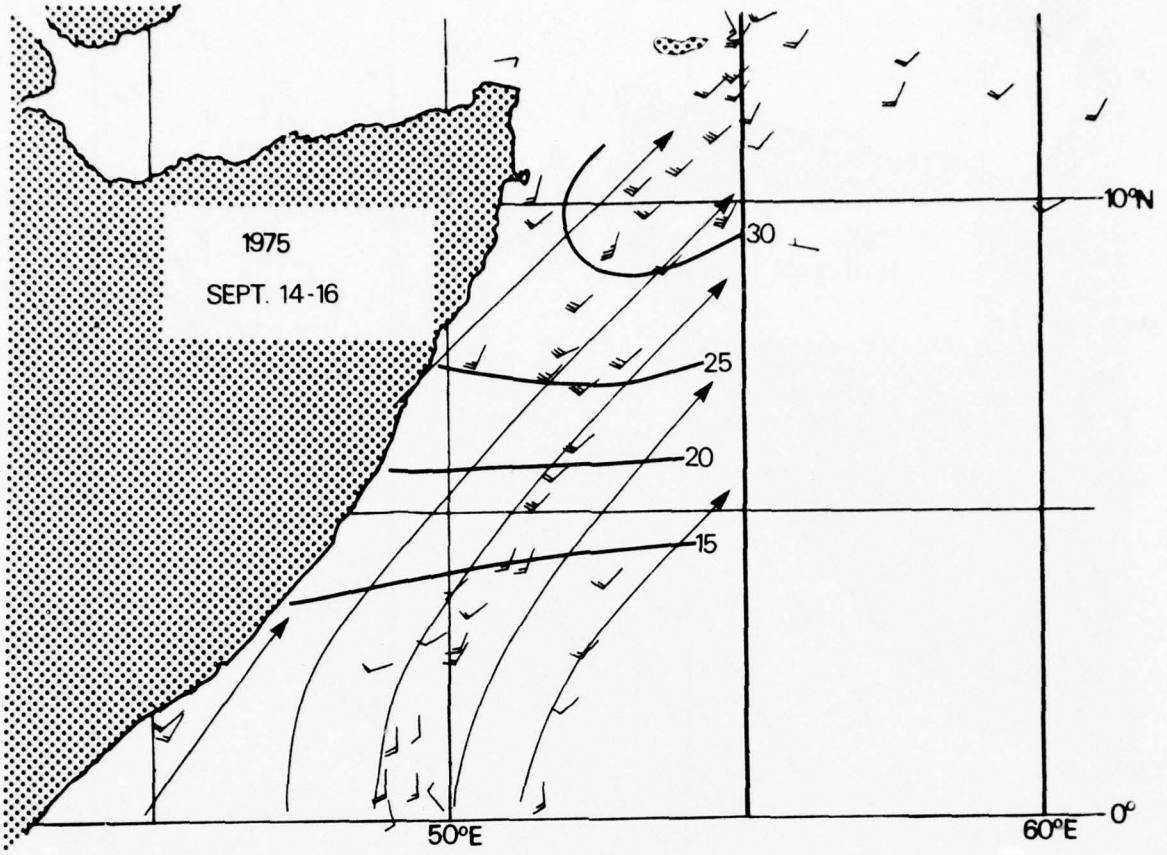

1975
AUG. 30 - SEPT. 1
35
30
25
20
15
10
10°N
0°
50°E
60°E

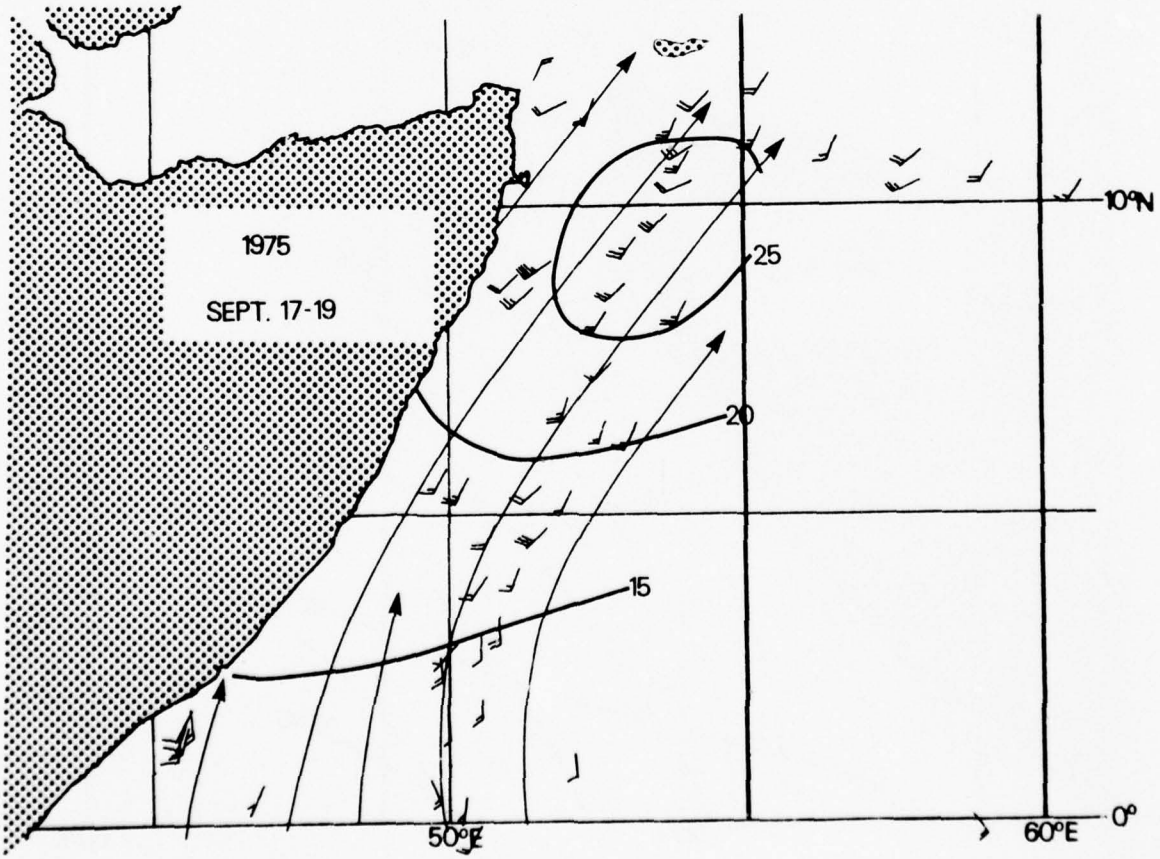

1975
SEPT. 2-4
30
25
20
15
10°N
0°
20
50°E
60°E

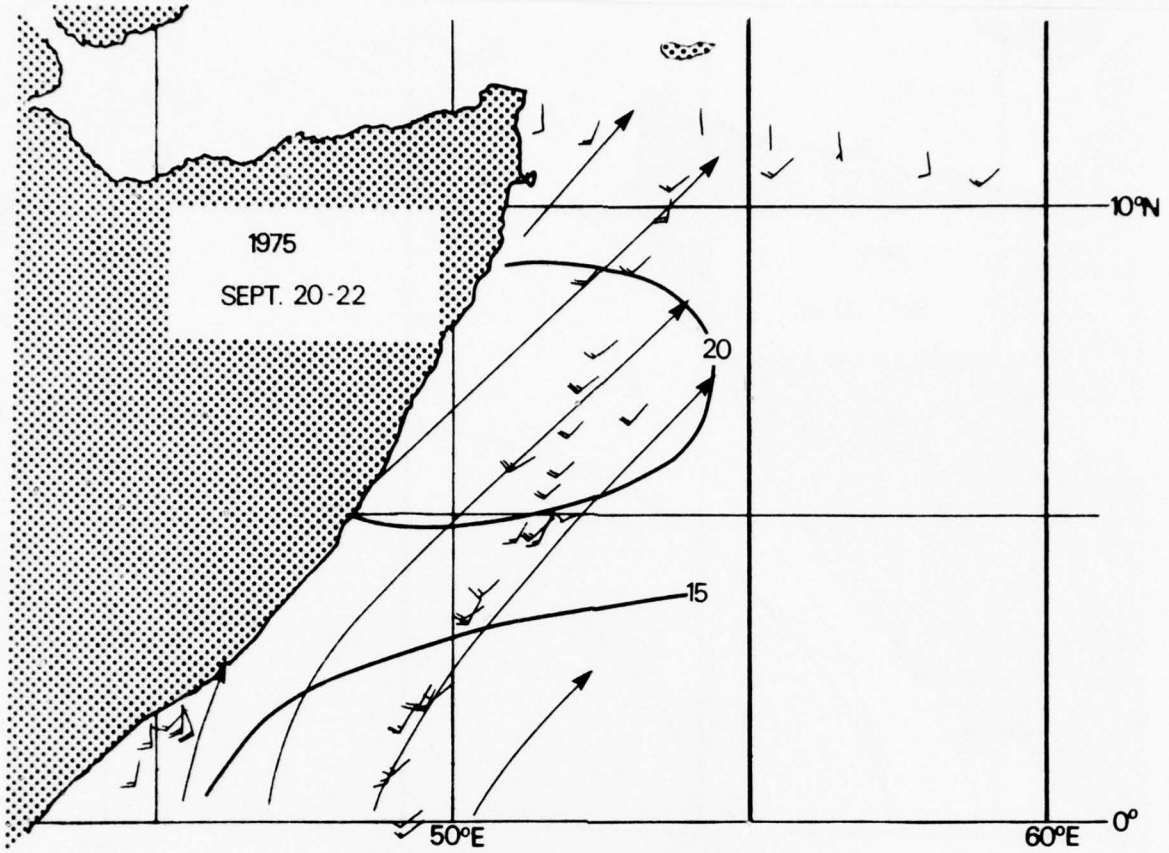

1975
SEPT. 5-7
25
20
15
10
10°N
0°
50°E
60°E

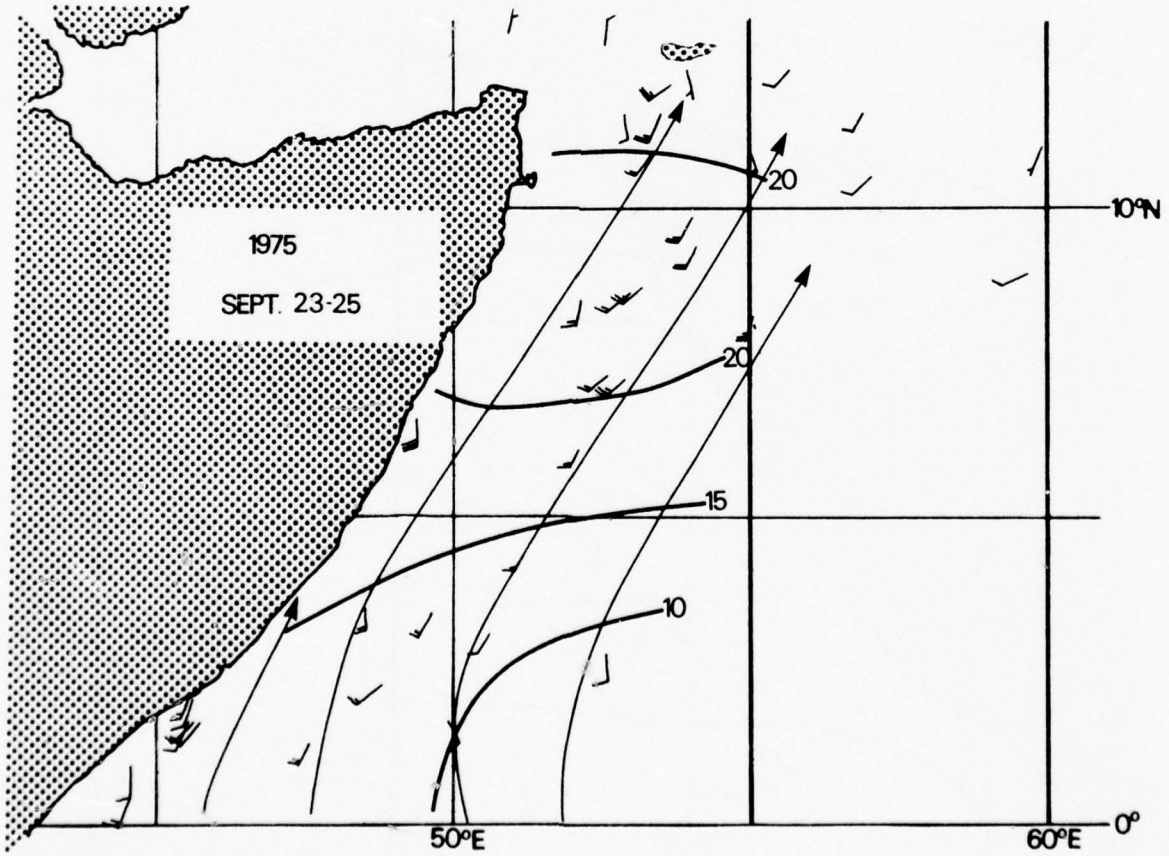

1975
SEPT. 8-10
25
20
15
10°N
0°
50°E
60°E

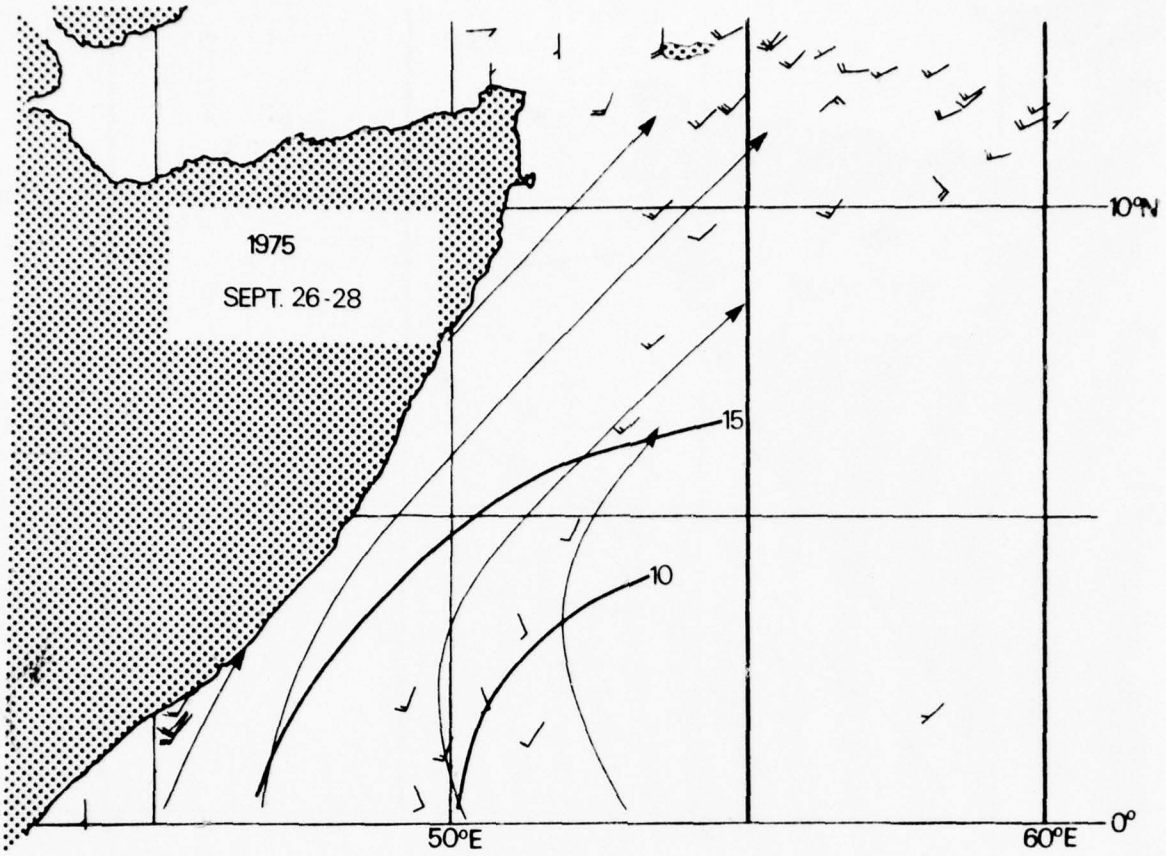

1975
SEPT. 11-13
25
20
15
10
10°N
0°
50°E
60°E

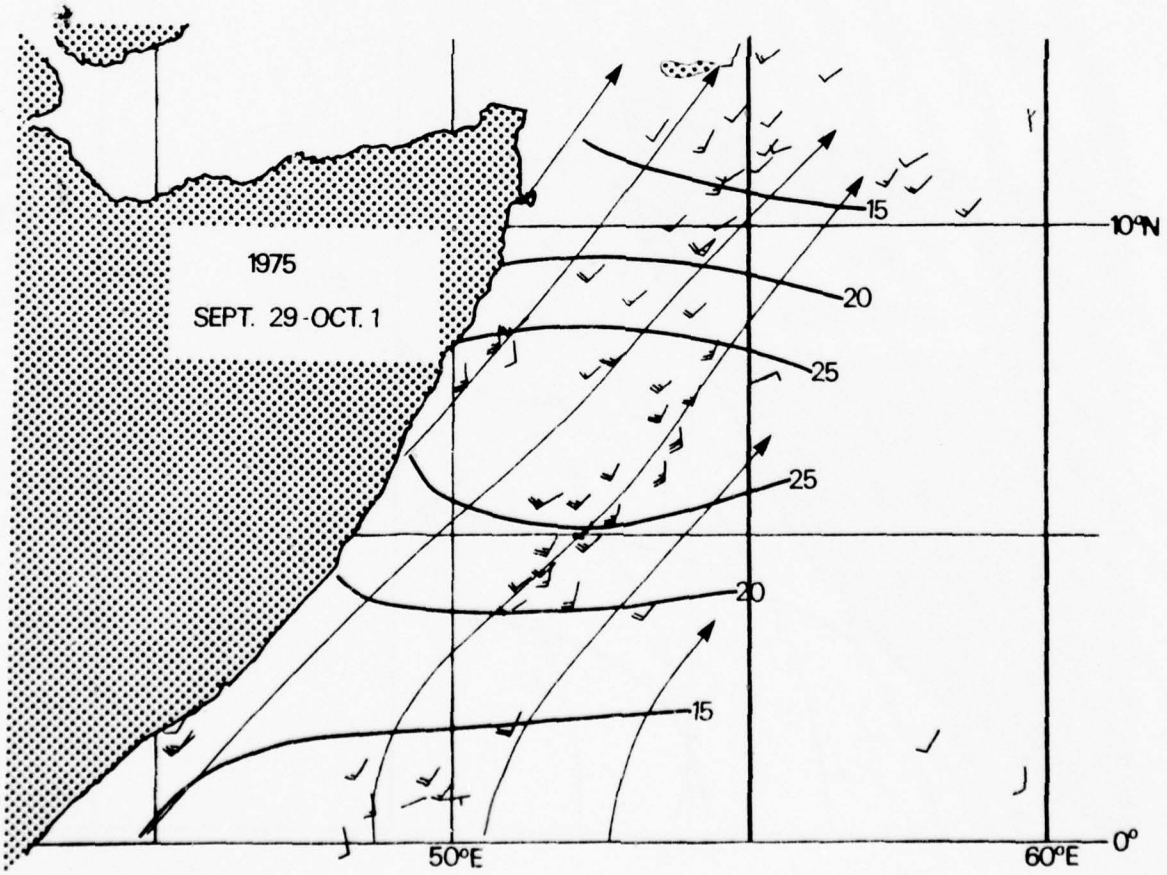

1975
SEPT. 14-16
10°N
30
25
20
15
50°E
60°E
0°

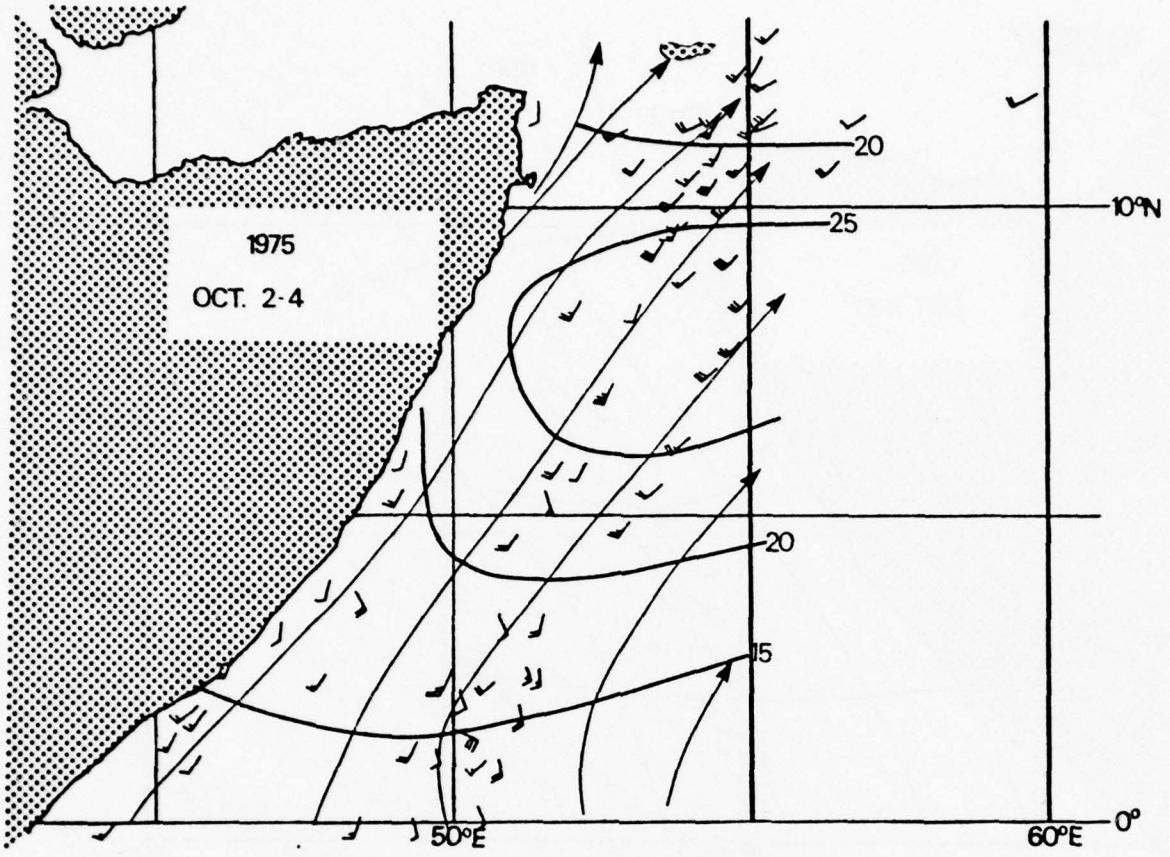

1975
SEPT. 17-19
10°N
25
20
15
50°E
60°E
0°

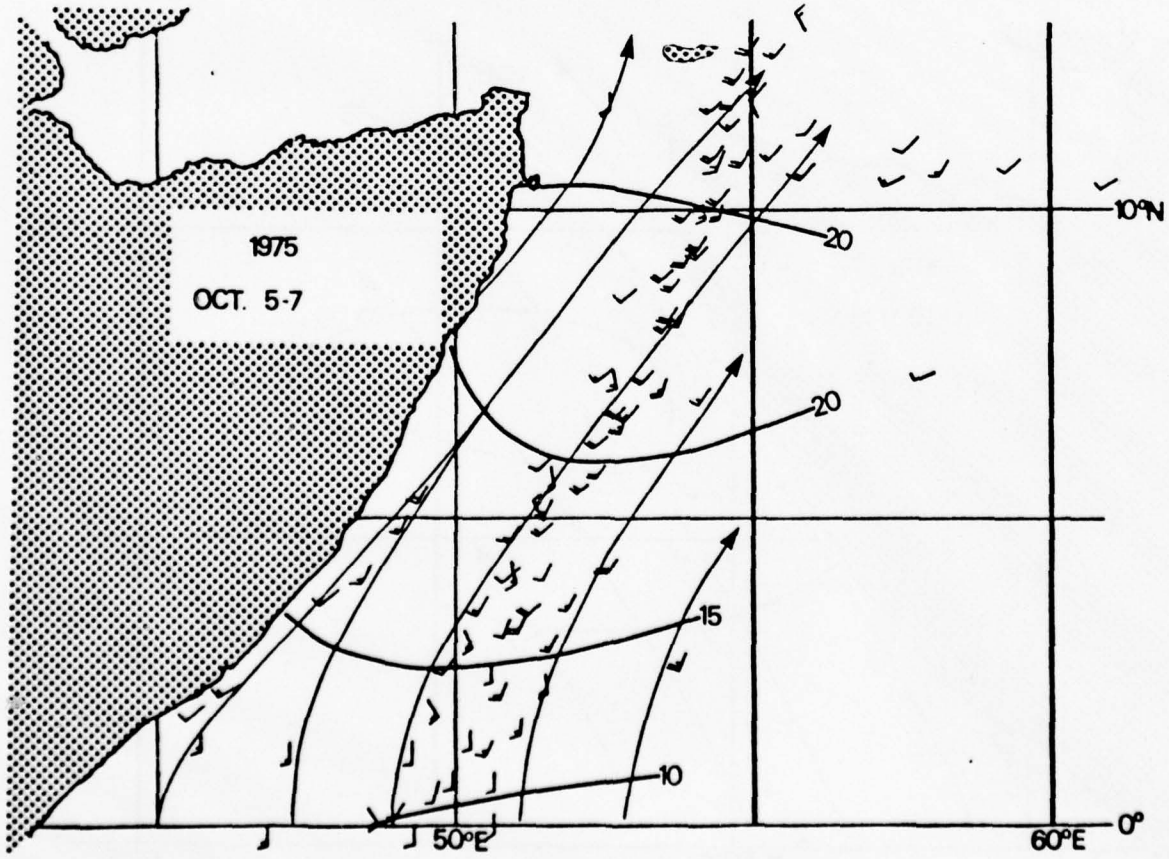

1975
SEPT. 20-22
20
15
10°N
0°
50°E
60°E

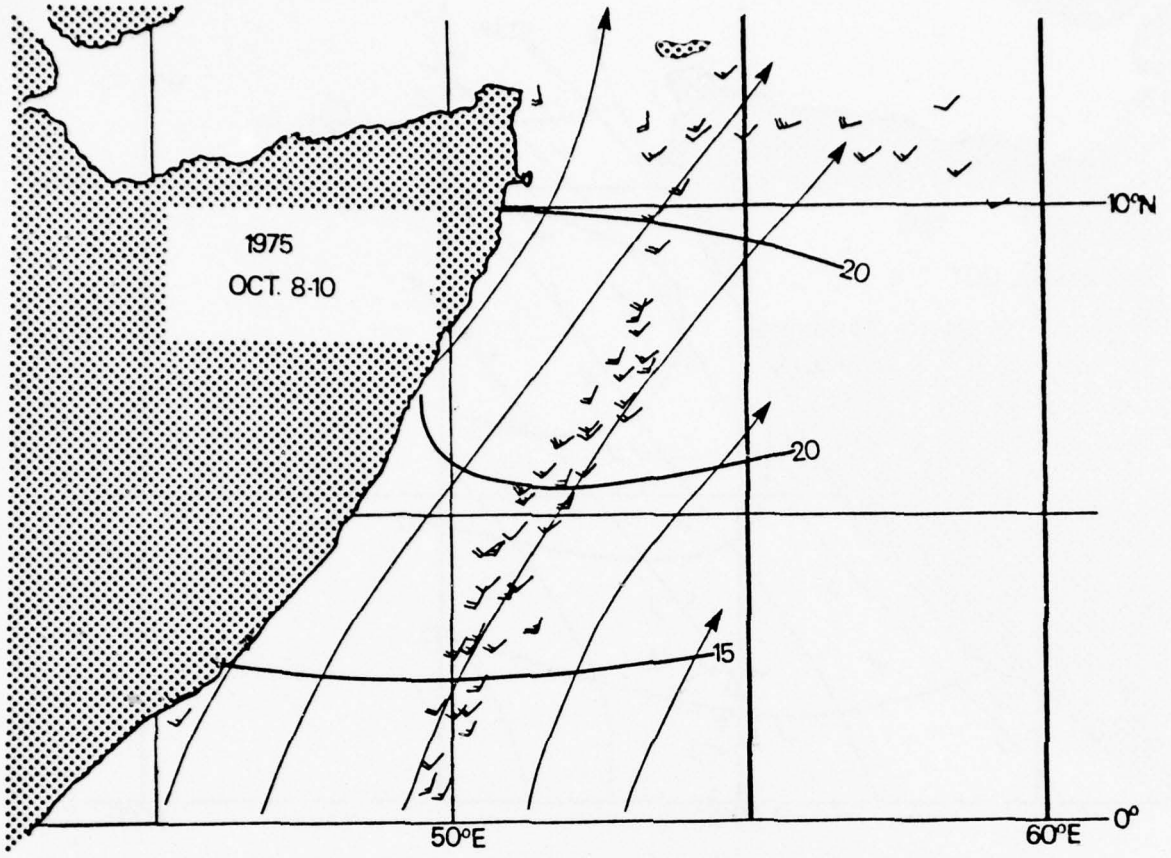

1975
SEPT. 23-25
20
20
15
10
10°N
0°
50°E
60°E

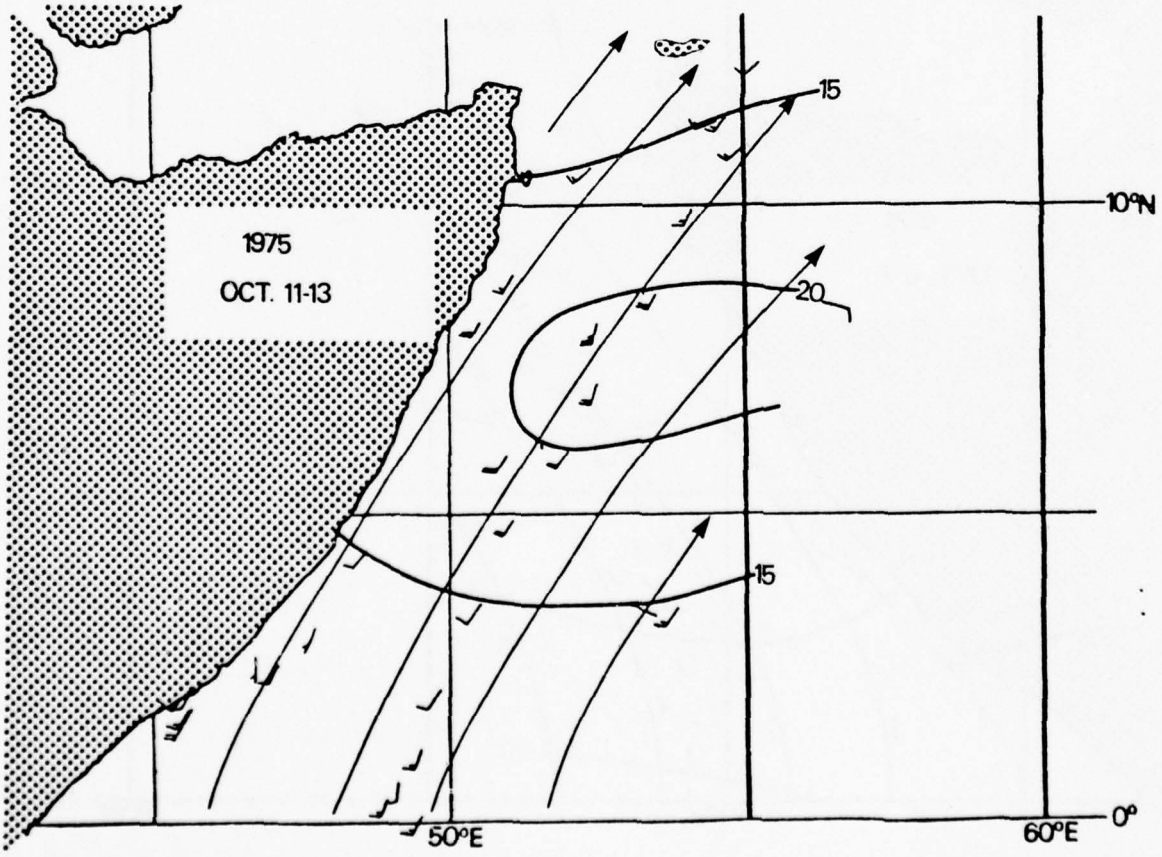

1975
SEPT. 26-28
10°N
15
10
50°E
60°E
0°

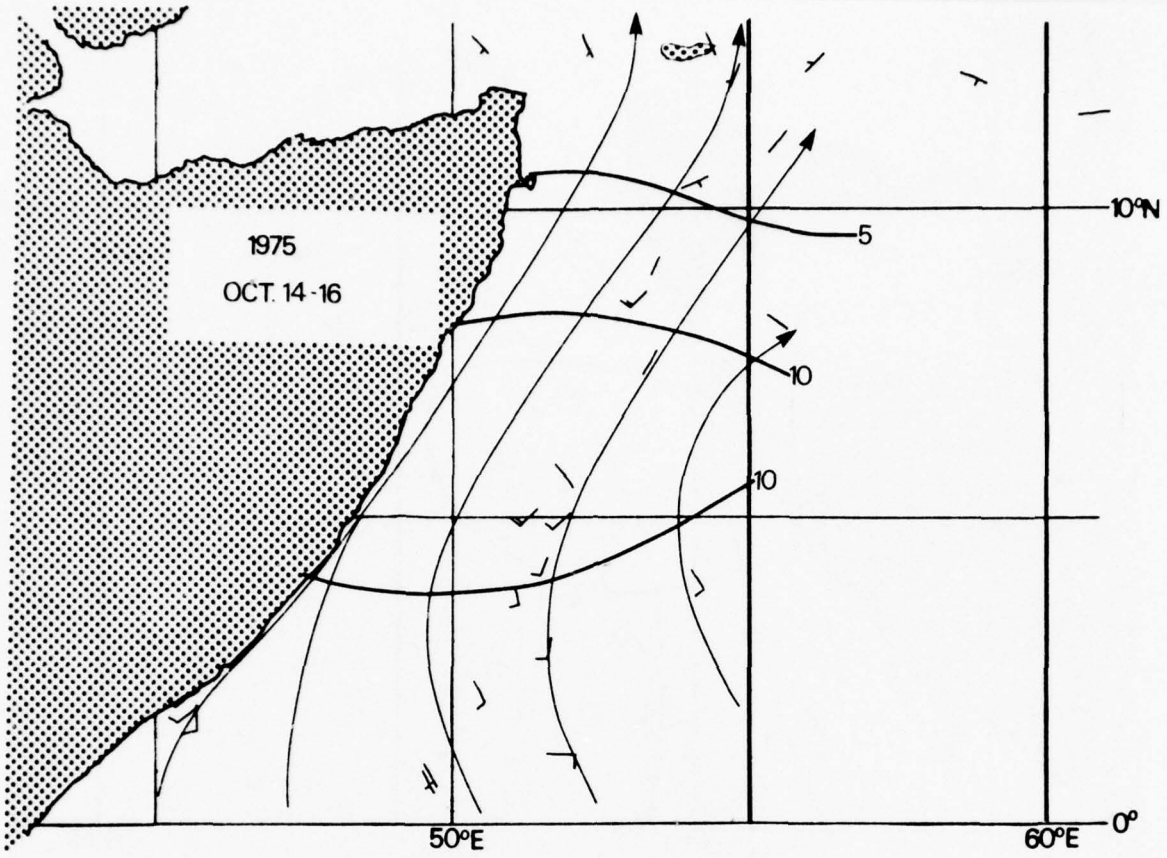

1975
SEPT. 29-OCT. 1
10°N
15
20
25
25
20
15
50°E
60°E
0°

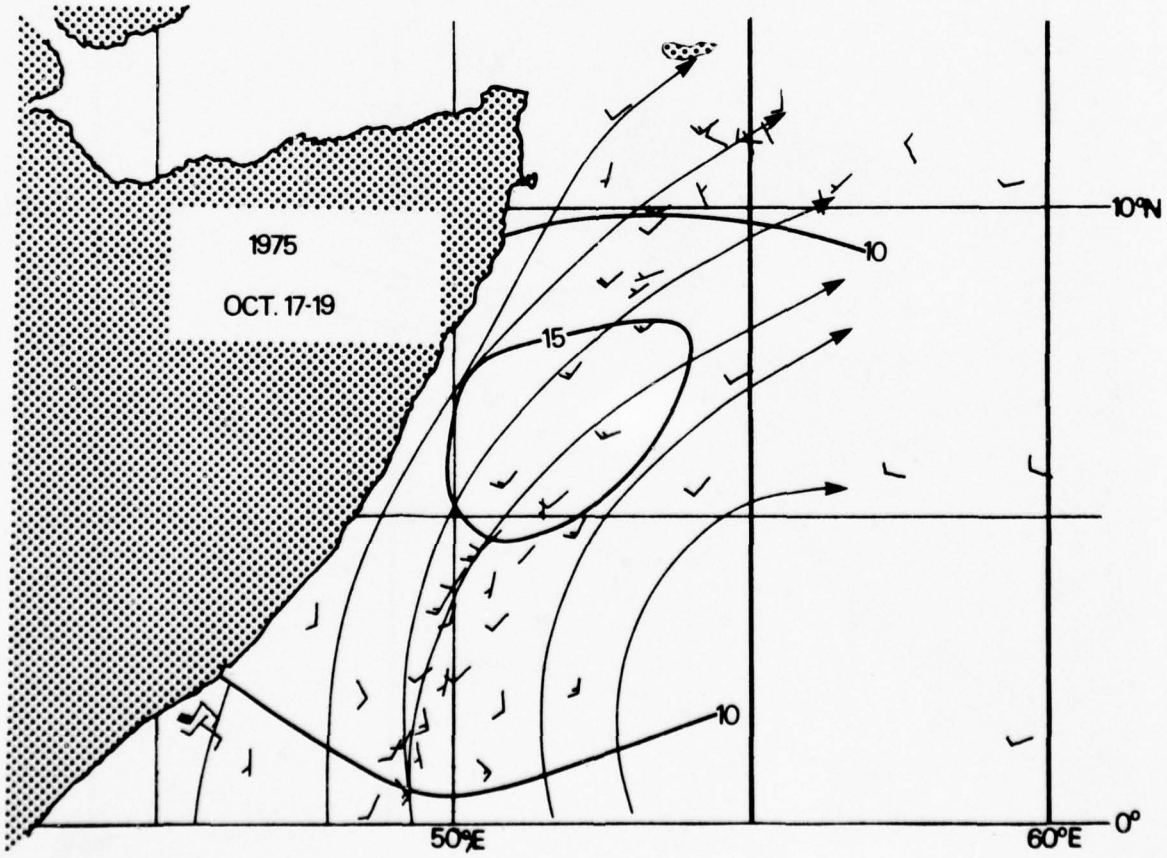

1975
OCT. 2-4
20
25
20
15
10°N
50°E
60°E
0°

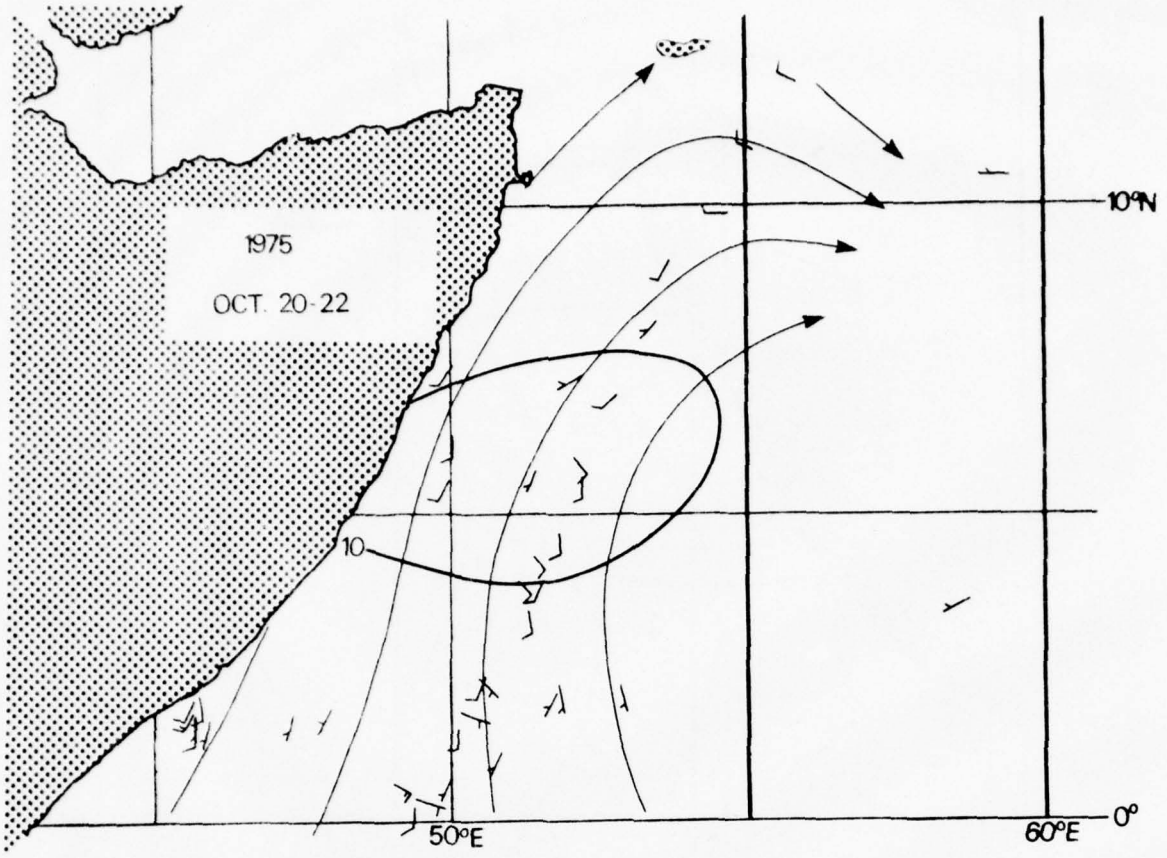

1975
OCT. 5-7
20
20
15
10
10°N
50°E
60°E
0°

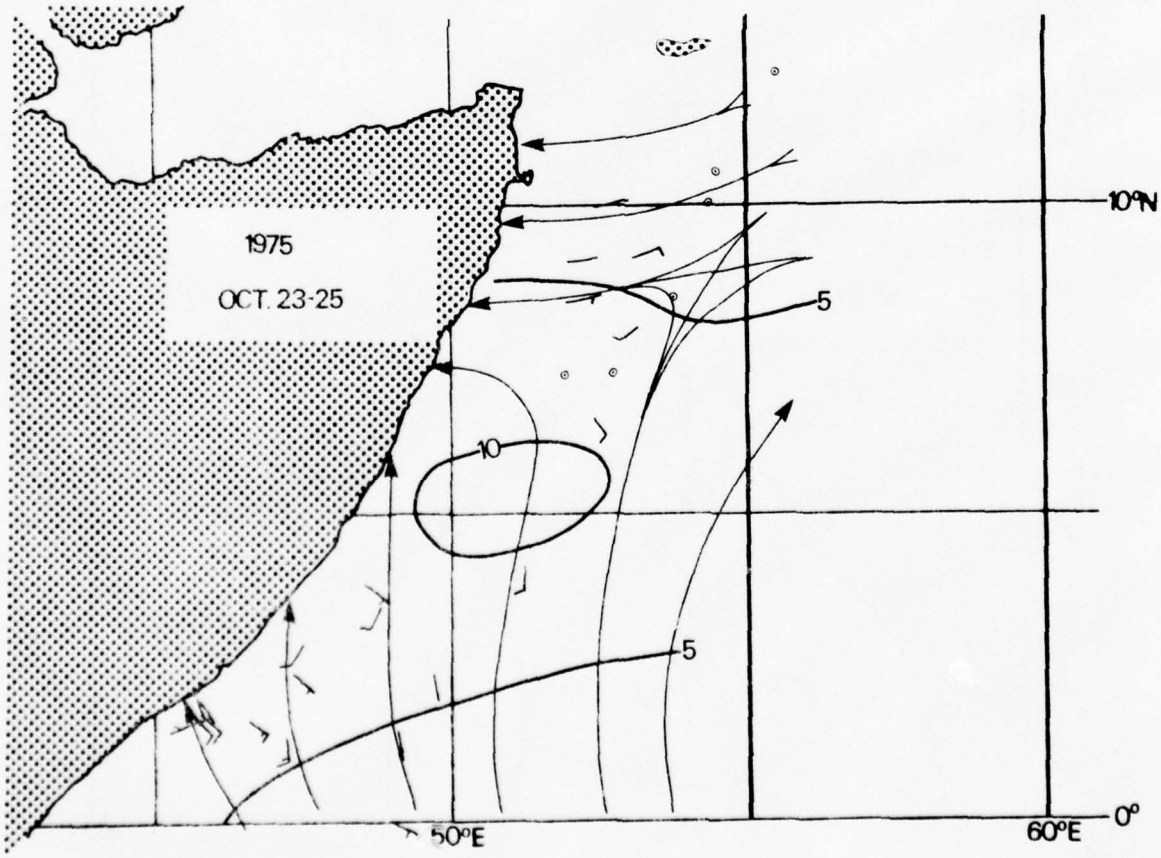

1975
OCT. 8-10
10°N
20
20
15
50°E
60°E
0°

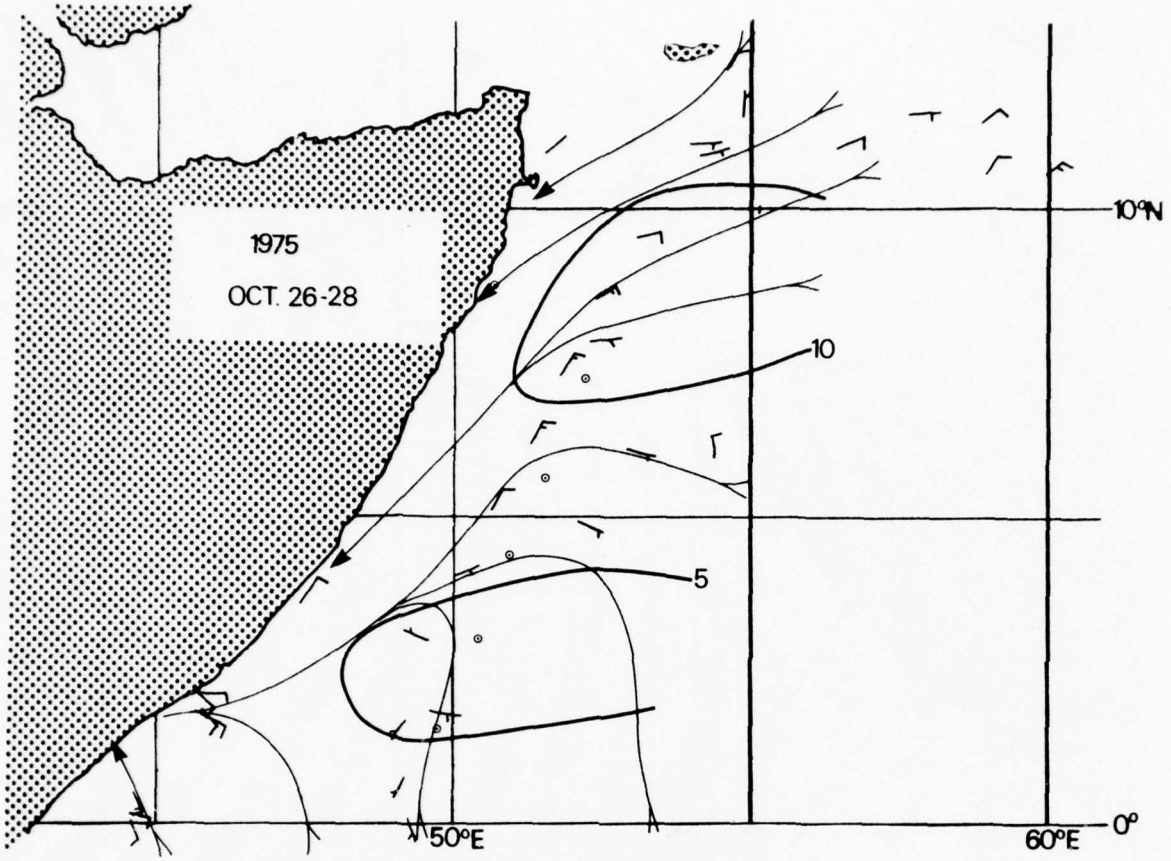

1975
OCT. 11-13
15
10°N
20
15
50°E
60°E
0°

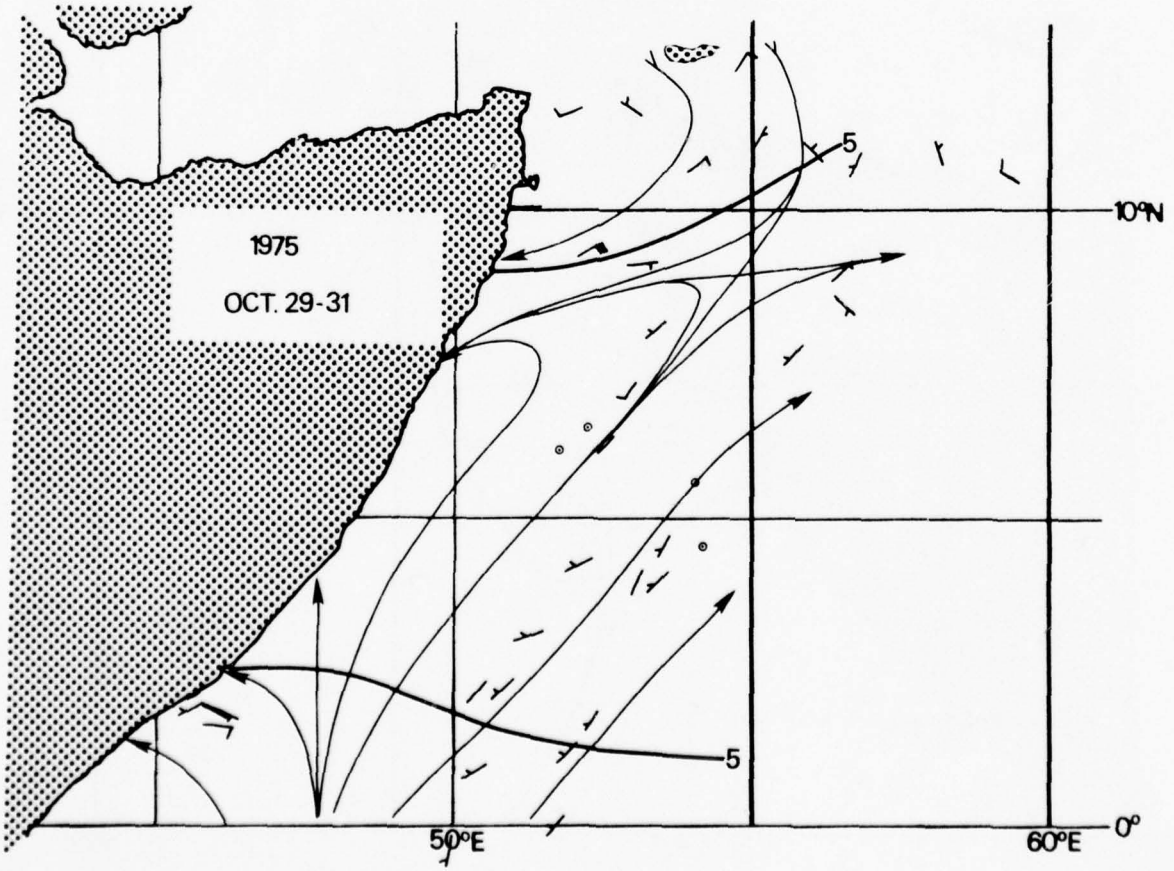

1975
OCT. 14-16
10°N
5
10
10
50°E
60°E
0°

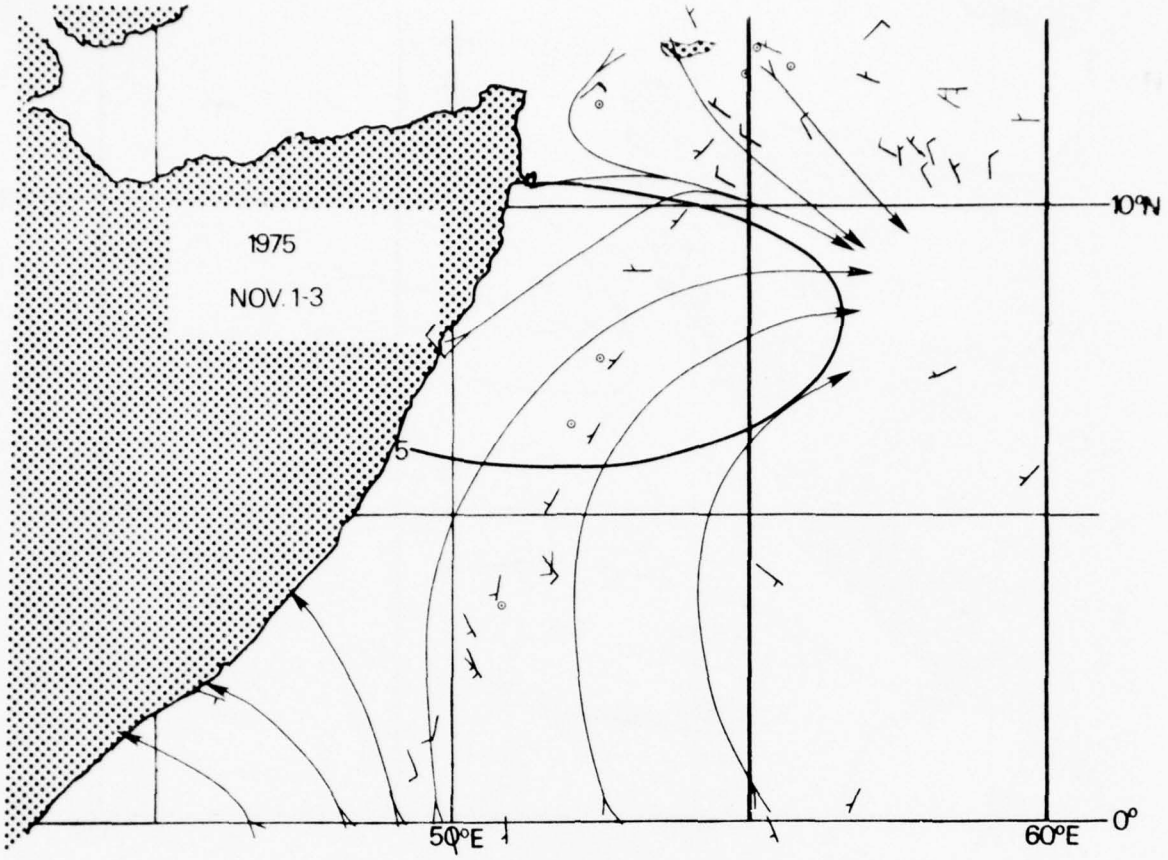

1975
OCT. 17-19
10°N
10
15
10
50°E
60°E
0°

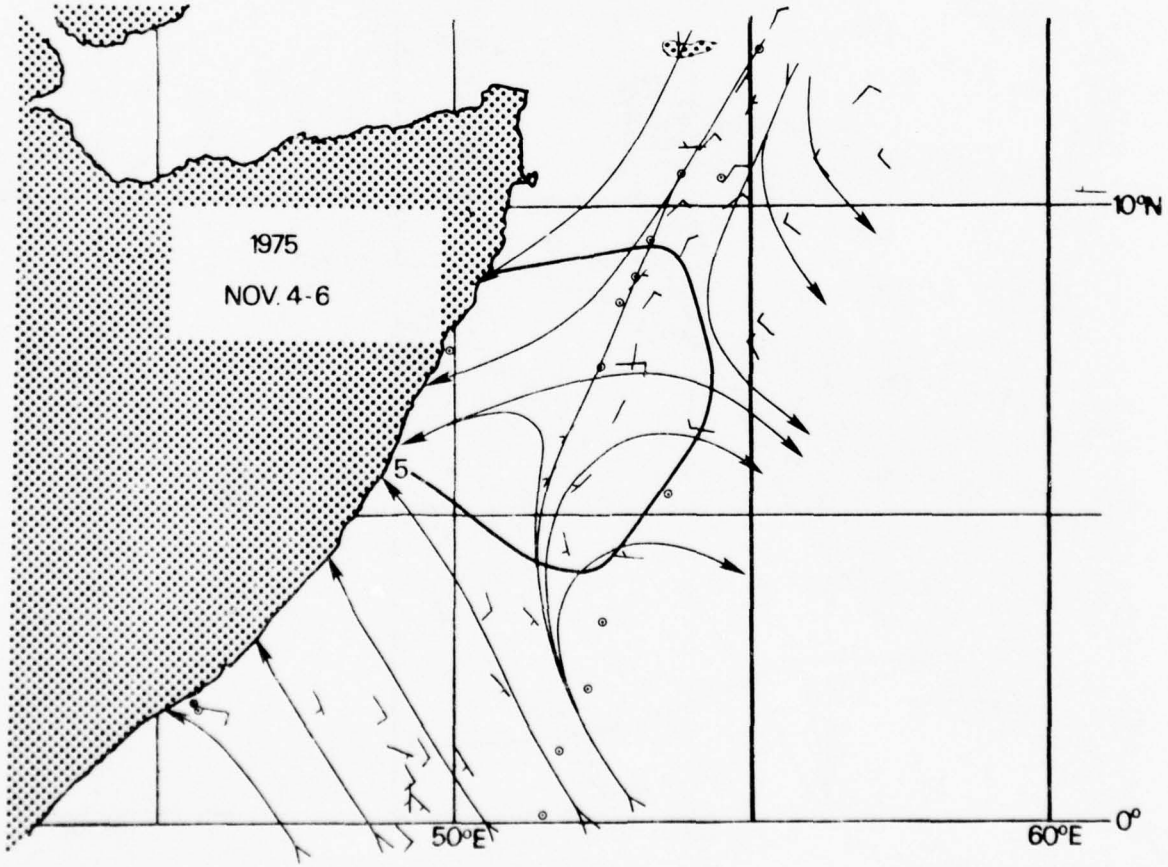

1975
OCT. 20-22
10°N
10
50°E
60°E
0°

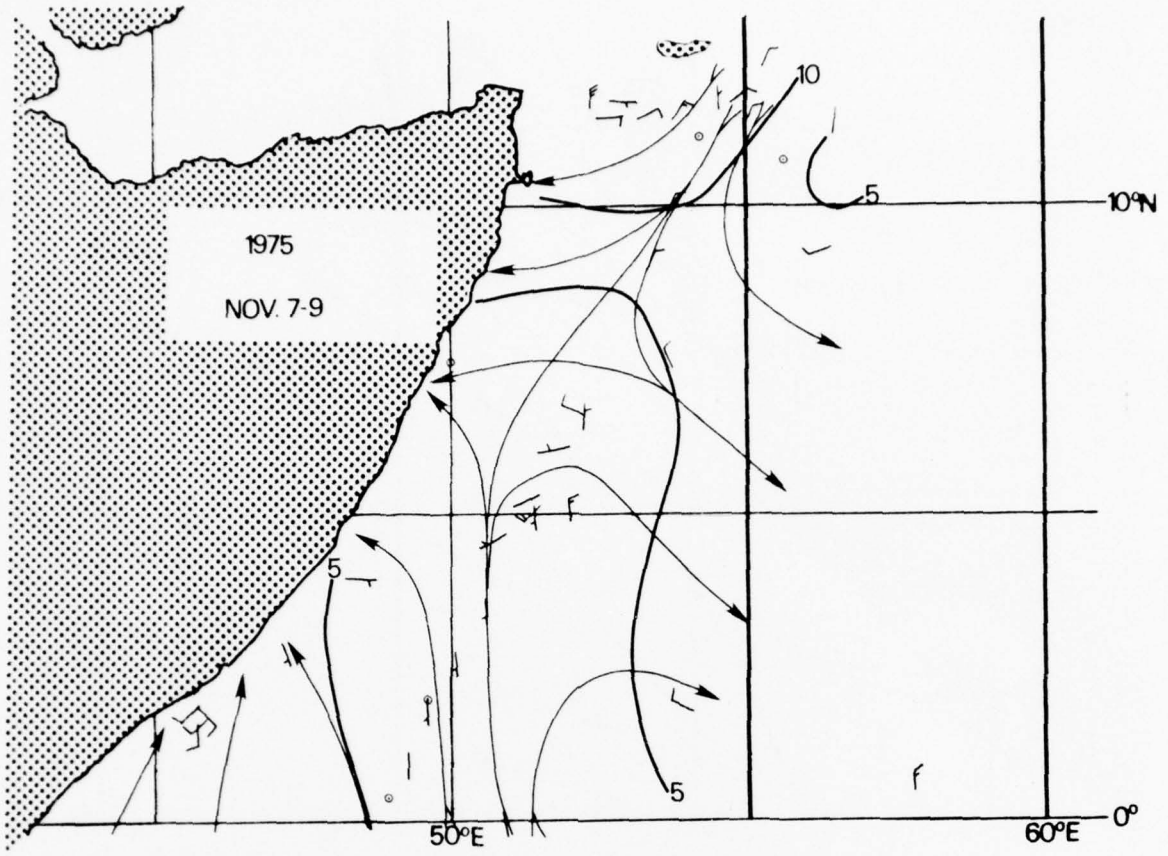

1975
OCT. 23-25
10°N
5
10
5
50°E
60°E
0°

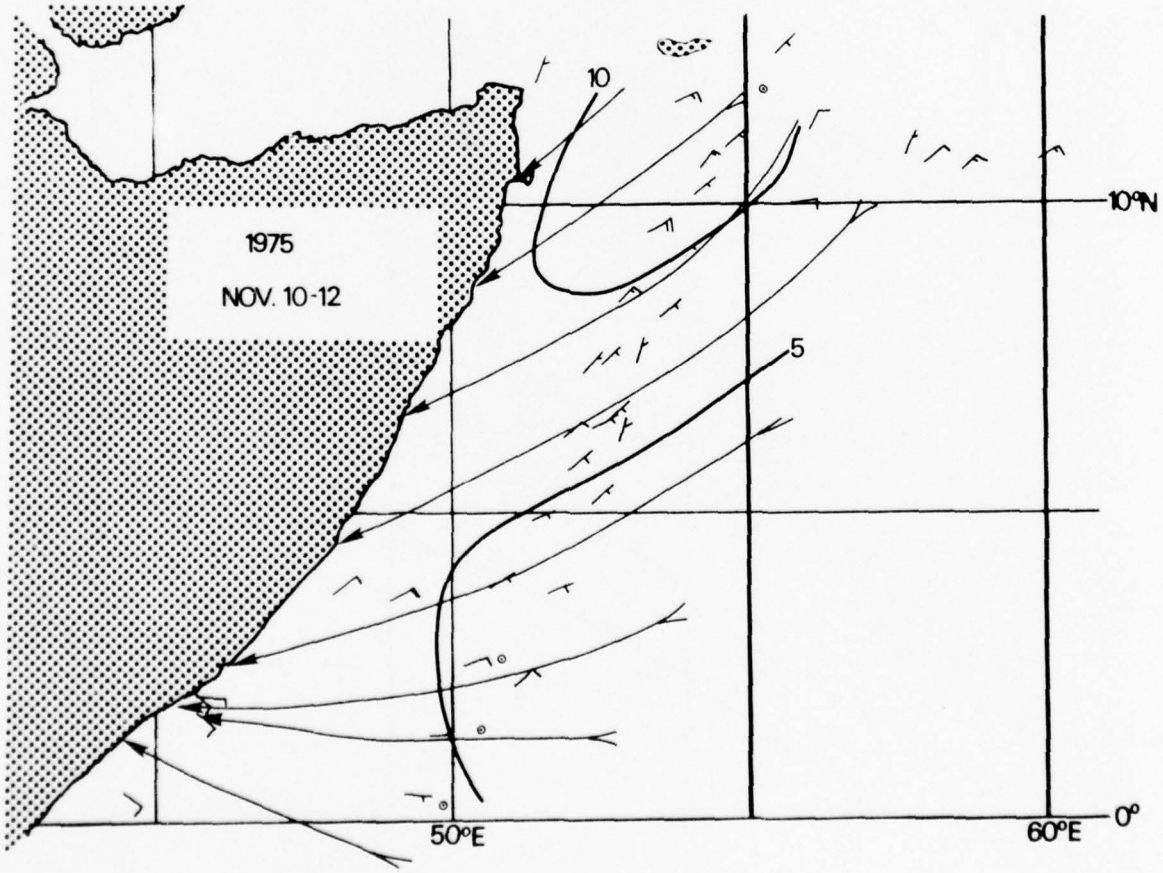

1975
OCT. 26-28
10°N
10
5
50°E
60°E
0°

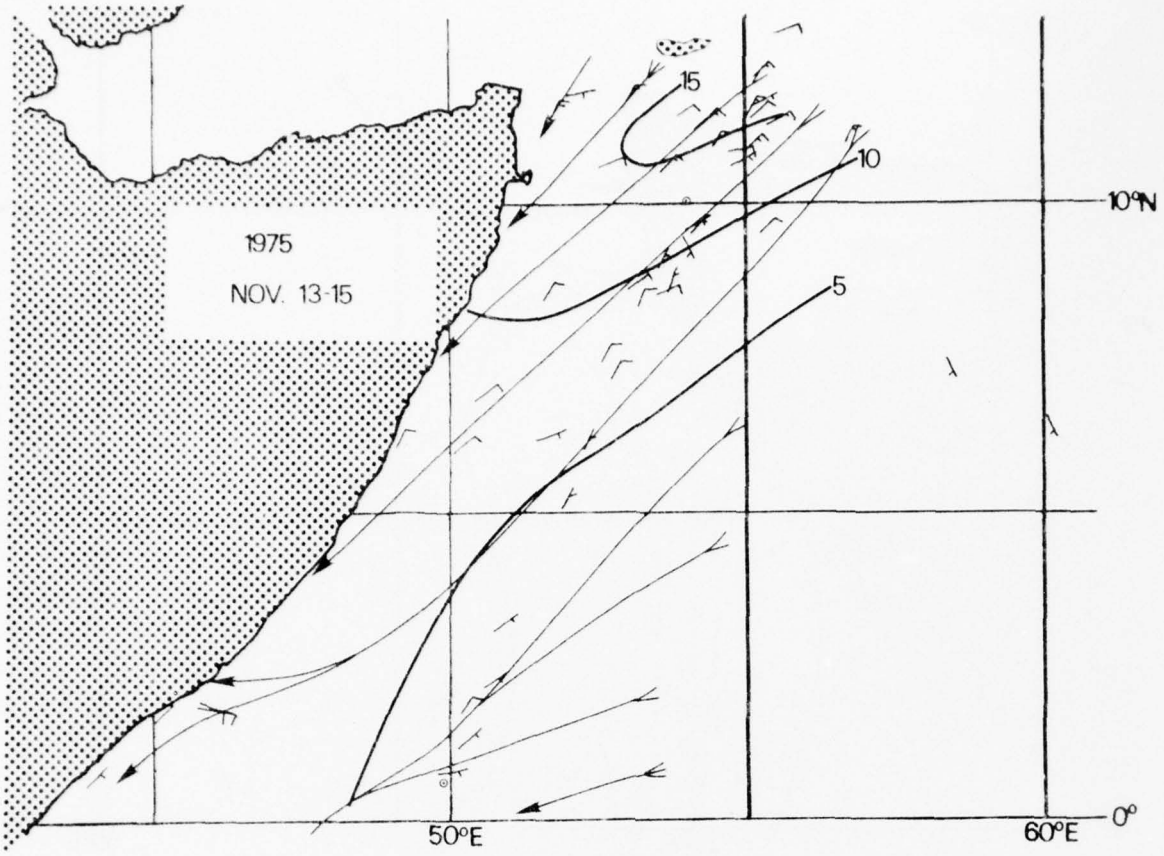

1975
OCT. 29-31
5
10°N
5
50°E
60°E
0°

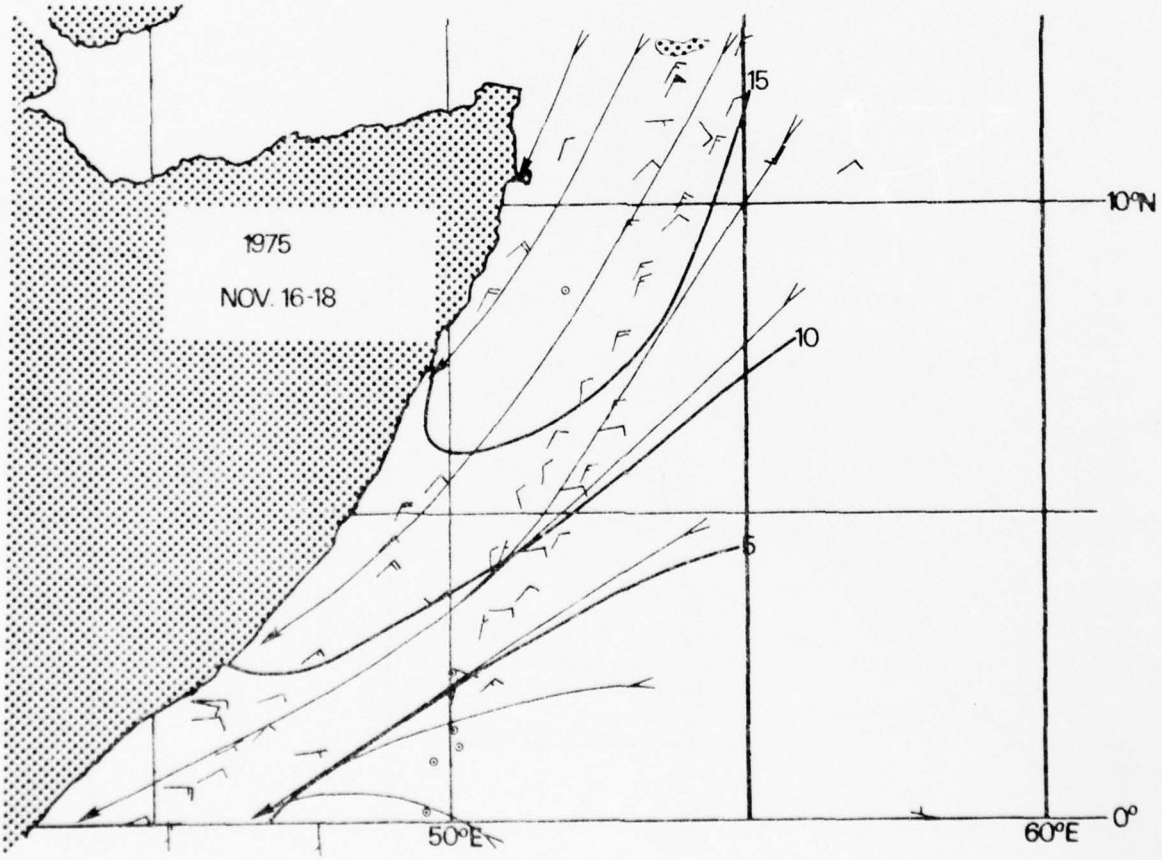

1975
NOV. 1-3
10°N
5
50°E
60°E
0°

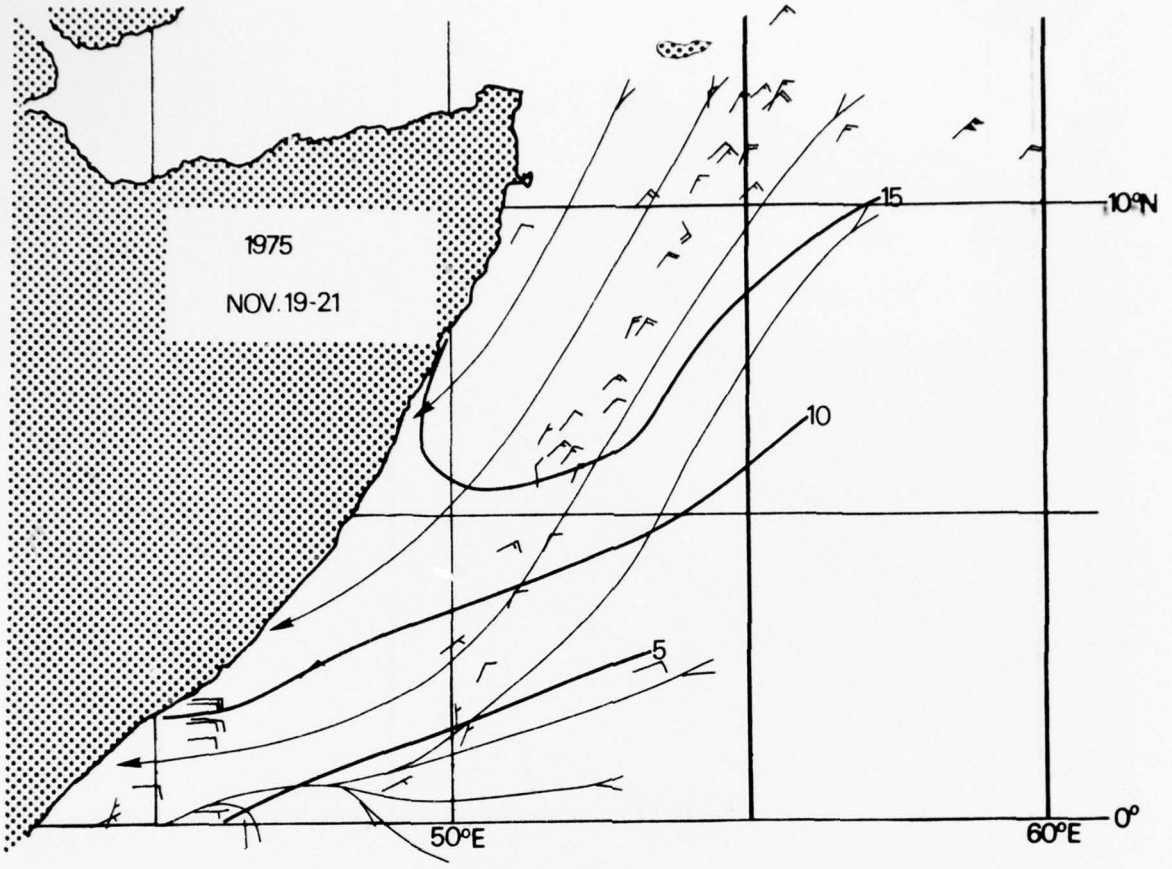

1975
NOV. 4-6
10°N
5
50°E
60°E
0°

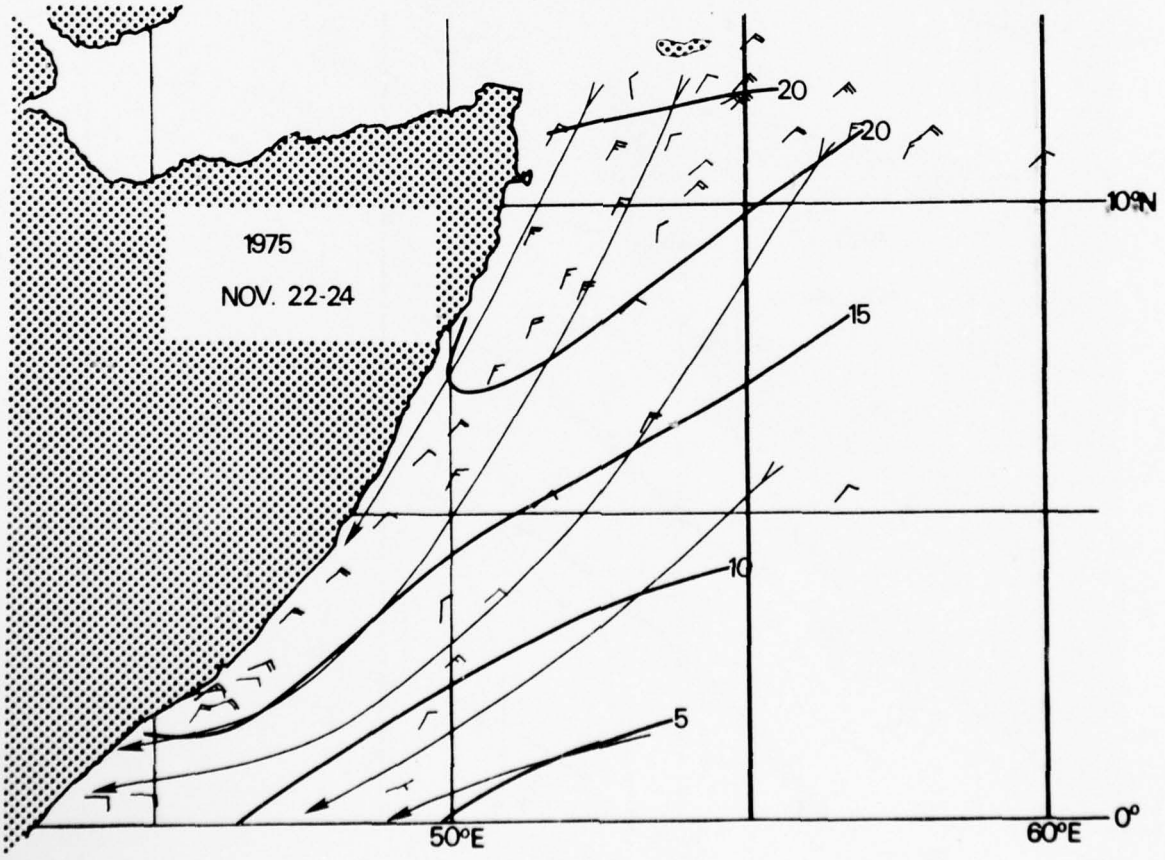

1975
NOV. 7-9
10
5
10°N
5
5
50°E
60°E
0°

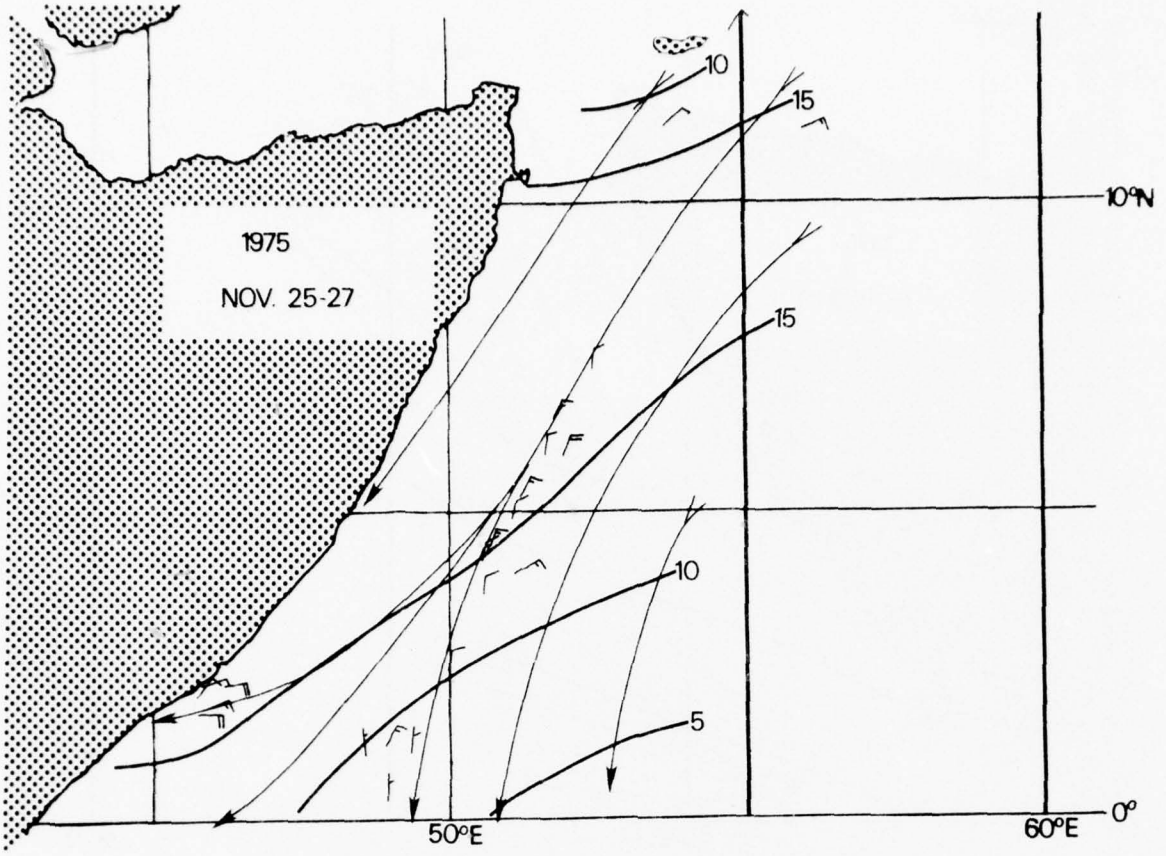

1975
NOV. 10-12
10
10°N
5
50°E
60°E
0°

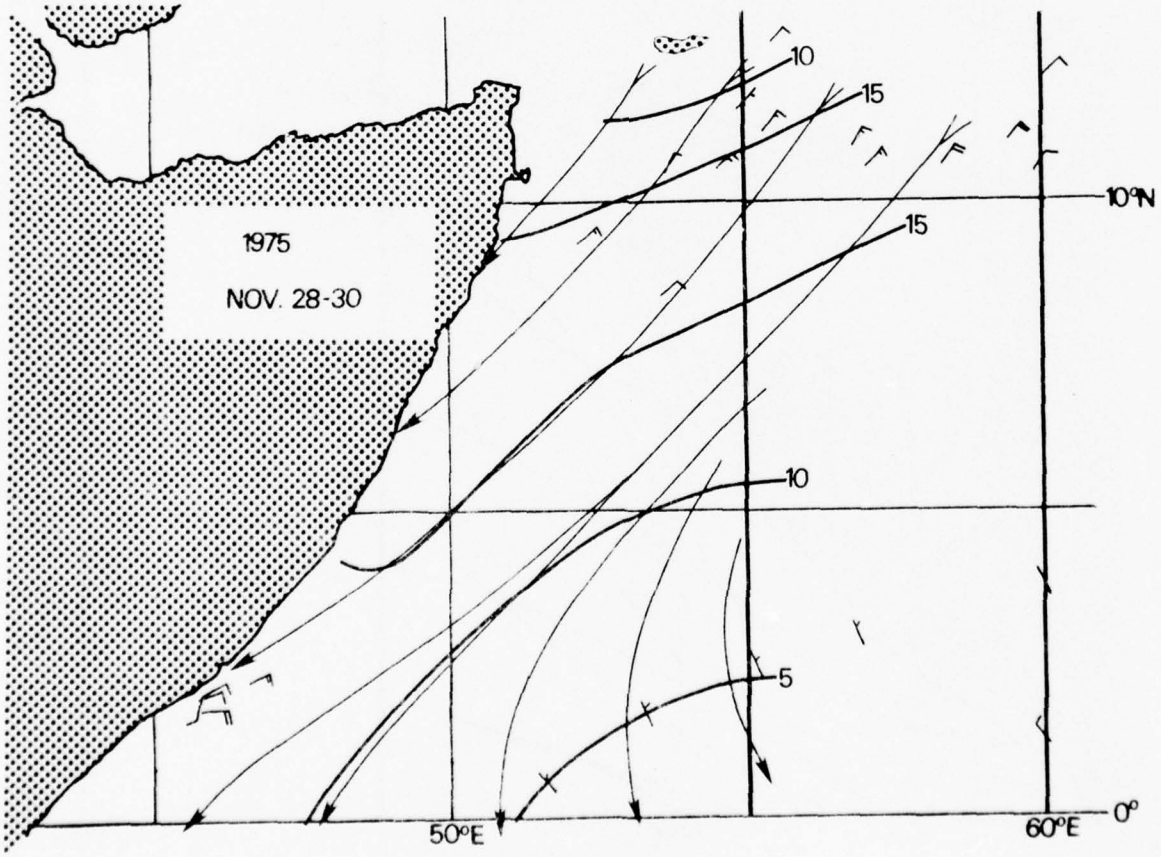

1975
NOV. 13-15
15
10
5
10°N
0°
50°E
60°E

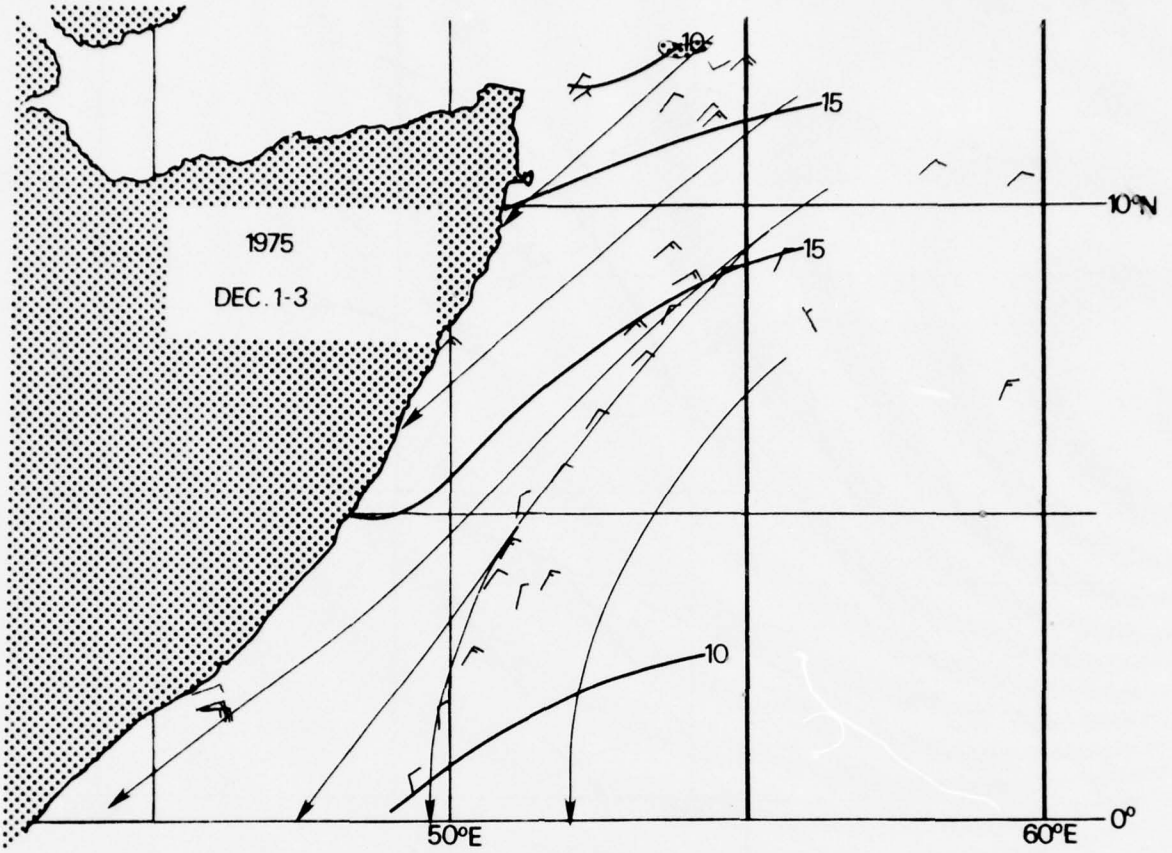

1975
NOV. 16-18
15
10
5
10°N
0°
50°E
60°E

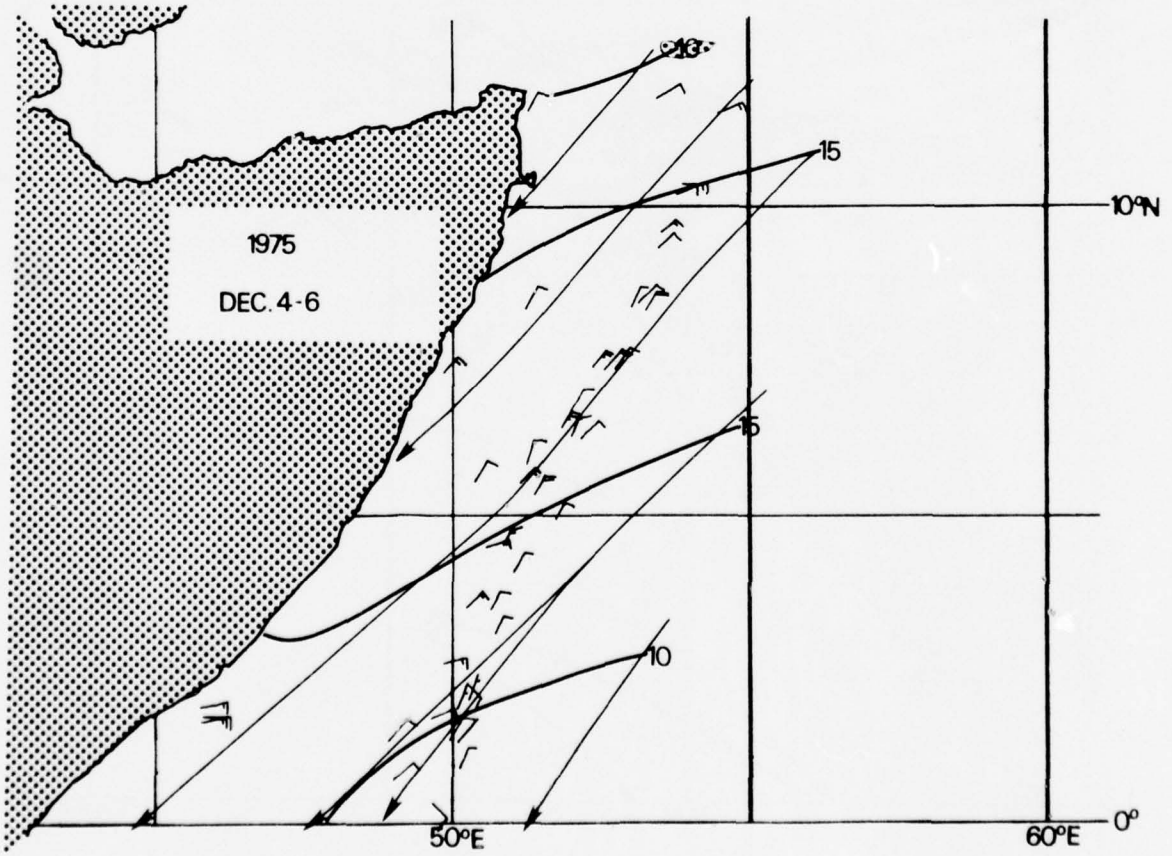

1975
NOV. 19-21
15
10
5
10°N
0°
50°E
60°E

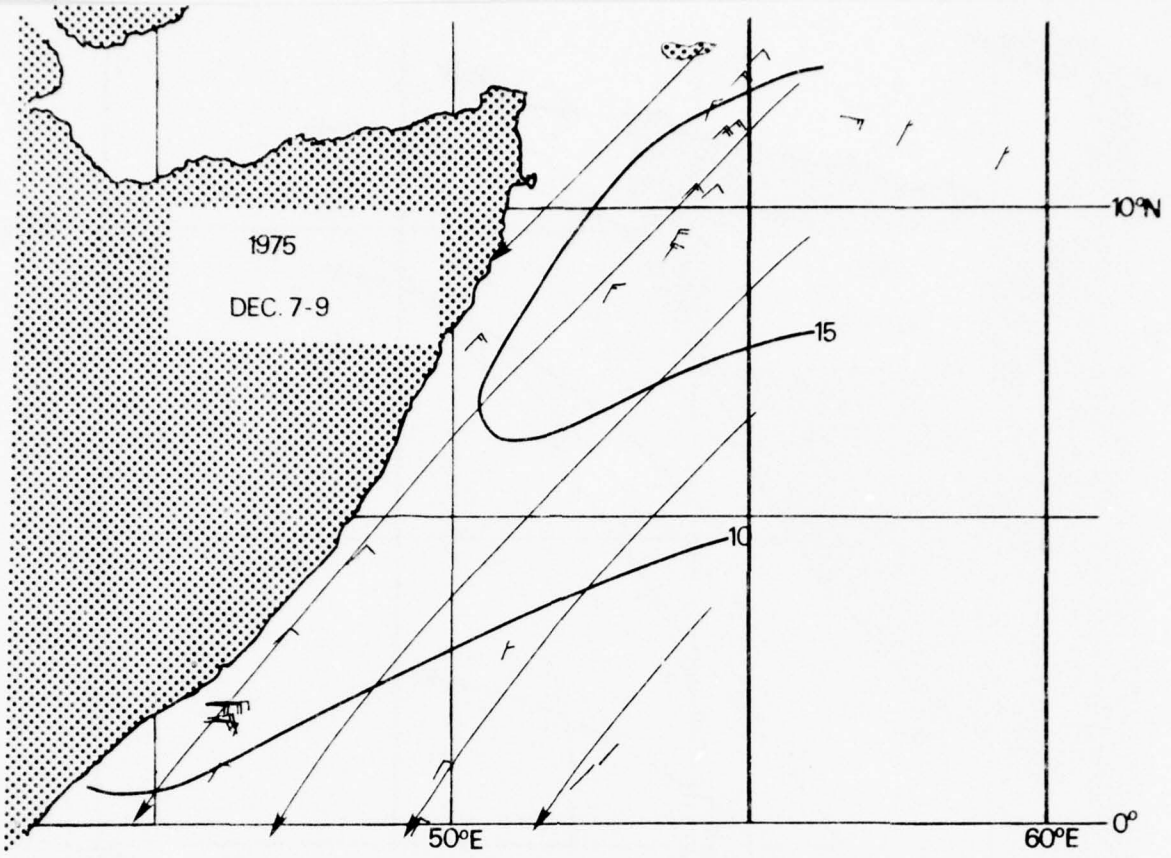

1975
NOV. 22-24
20
20
15
10
5
10°N
0°
50°E
60°E

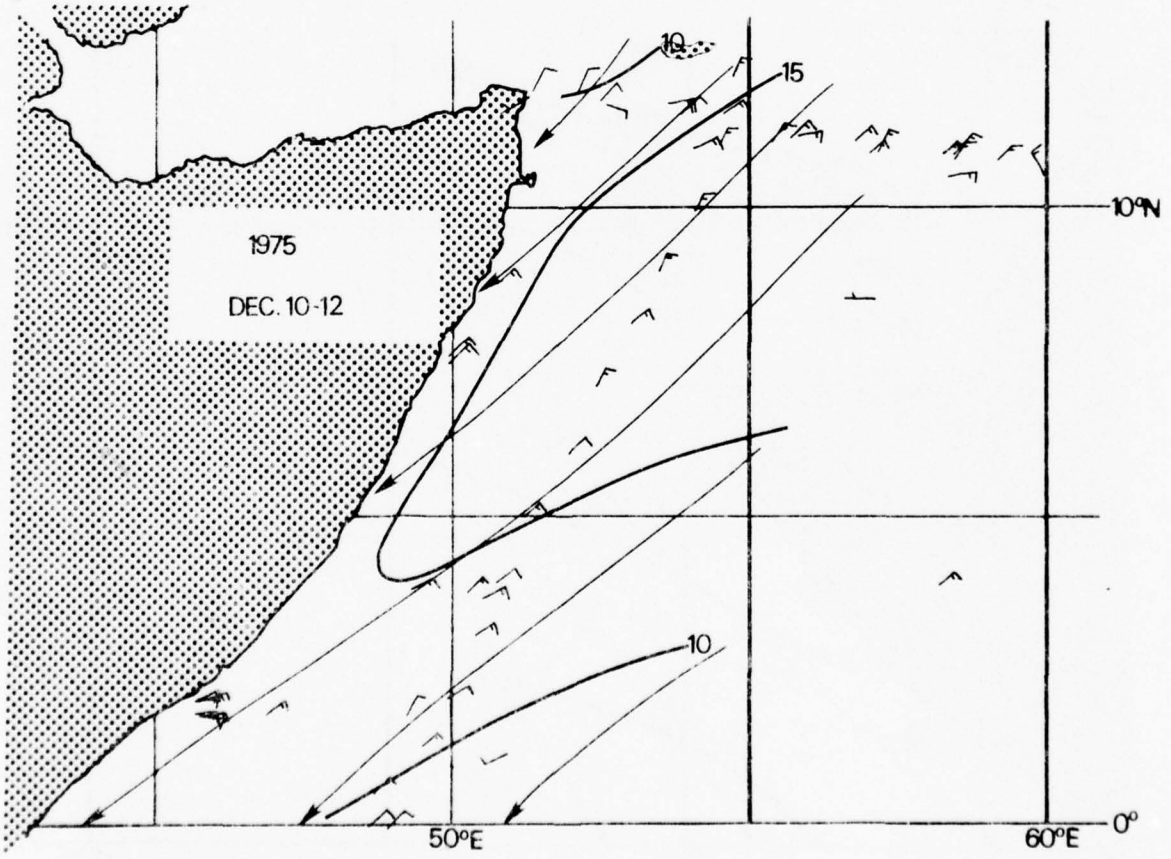

1975
NOV. 25-27
10
15
15
10
5
10°N
0°
50°E
60°E

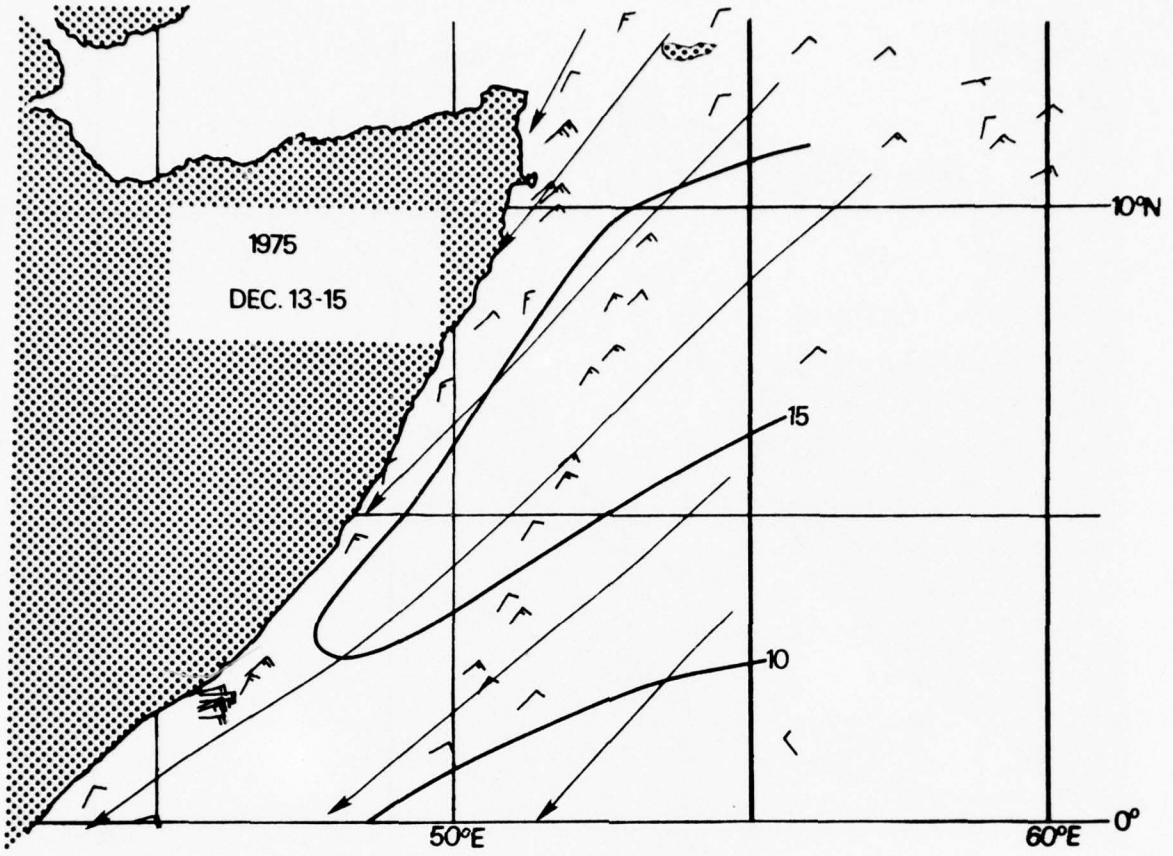

1975
NOV. 28-30
10
15
15
10
5
10°N
0°
50°E
60°E

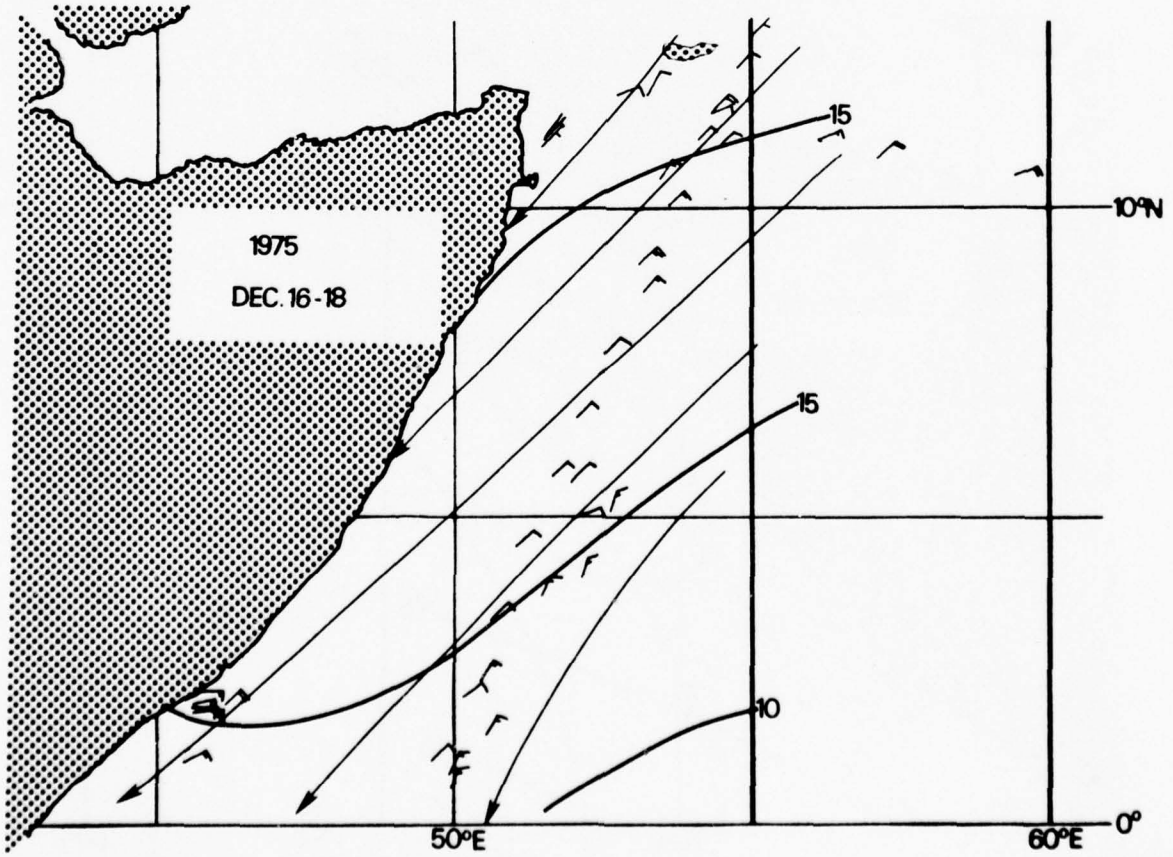

10
15
10°N
1975
DEC. 1-3
15
10
50°E
60°E
0°

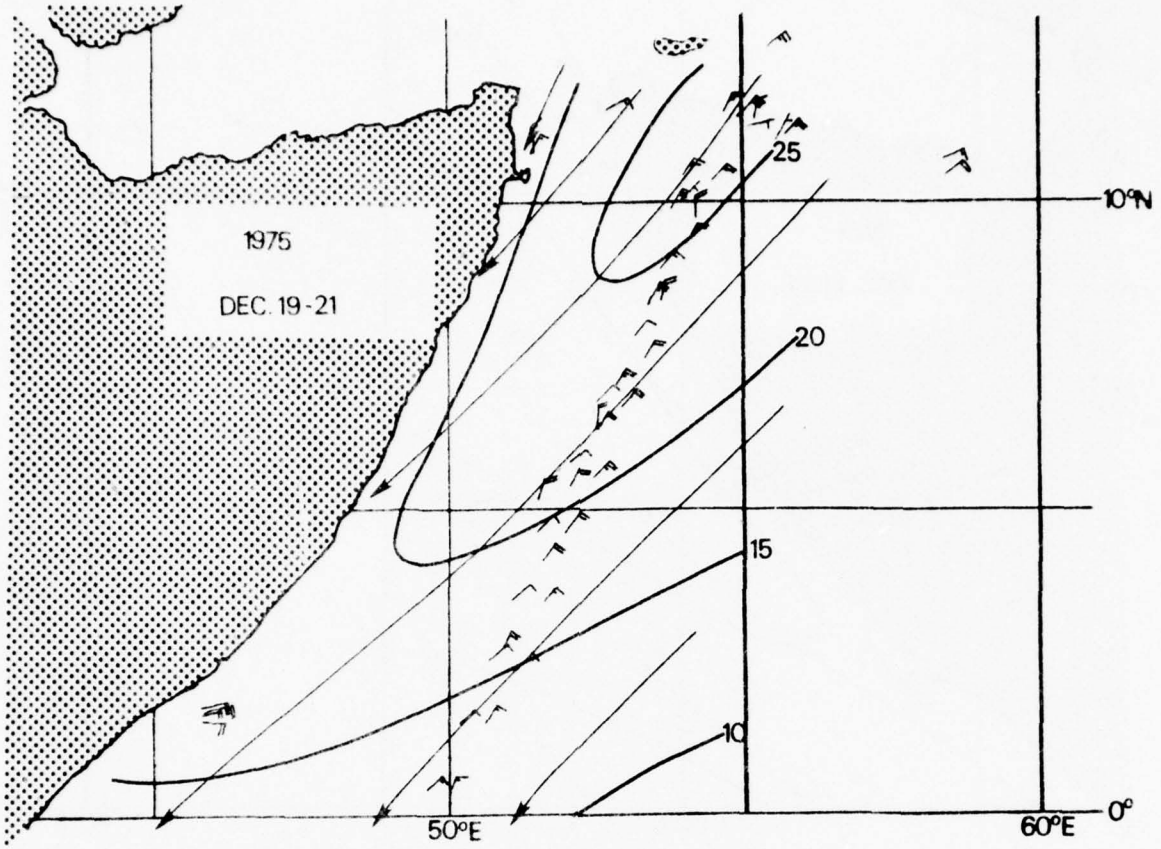

10
15
10°N
1975
DEC. 4-6
15
10
50°E
60°E
0°

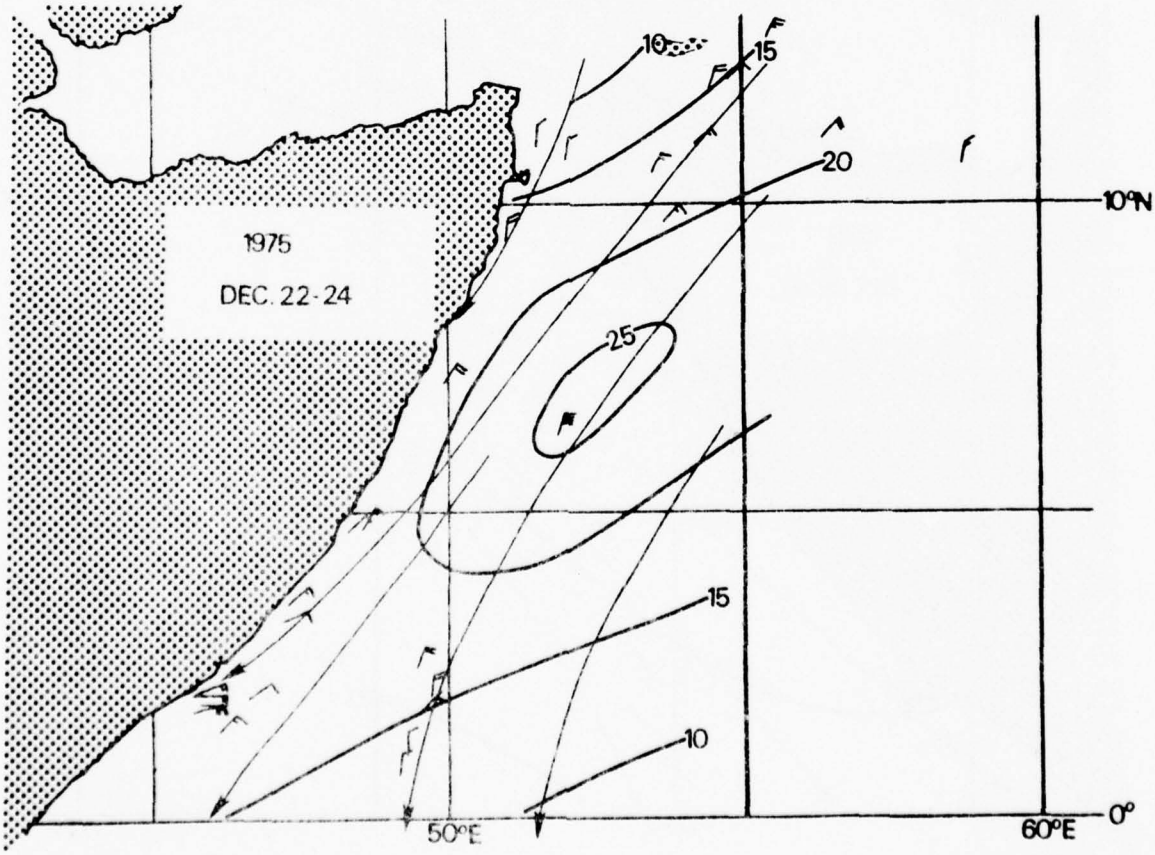

1975
DEC. 7-9
10°N
15
10
50°E
60°E
0°

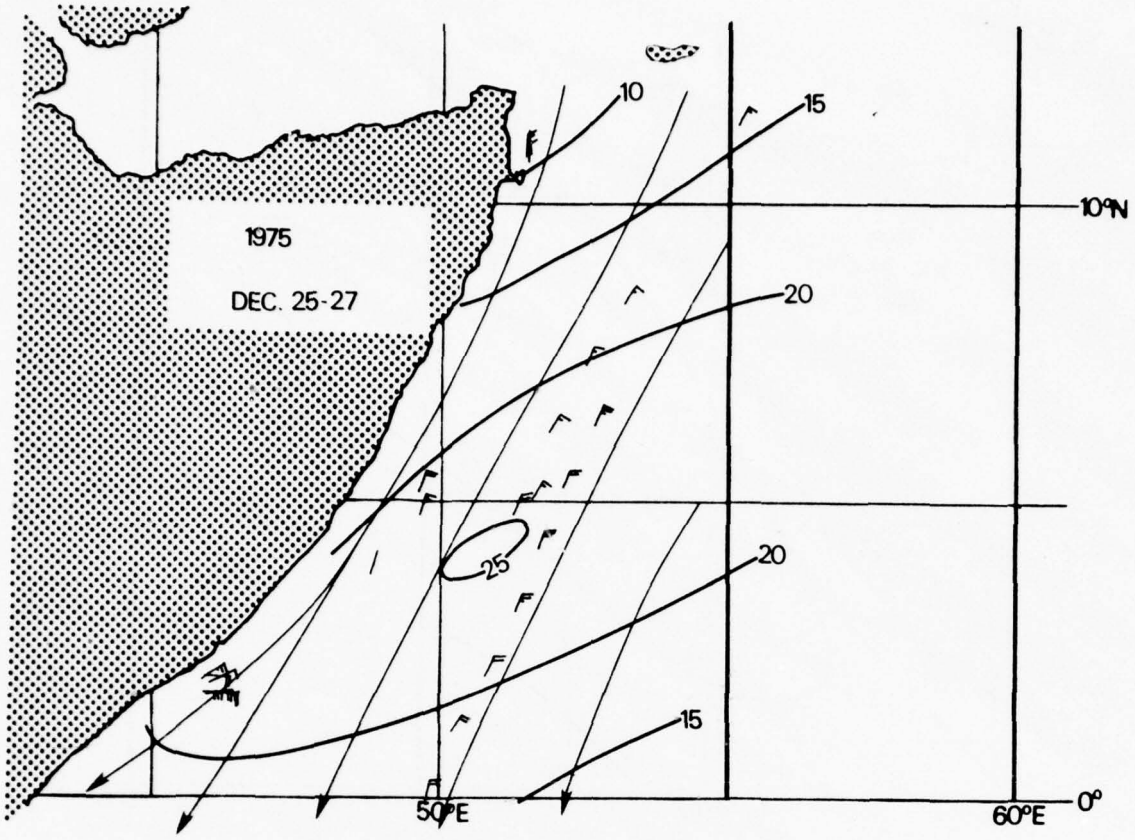

10
15
1975
DEC. 10-12
10°N
10
50°E
60°E
0°

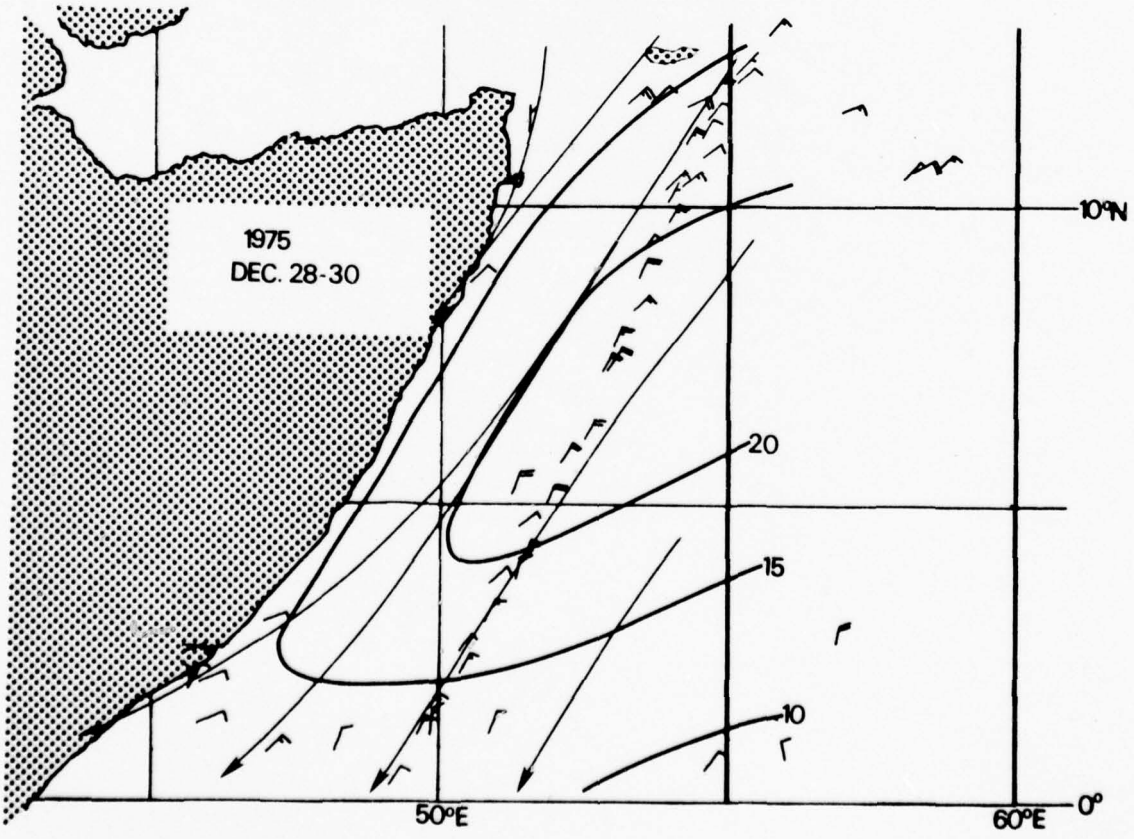

1975
DEC. 13-15
10°N
15
10
50°E
60°E
0°

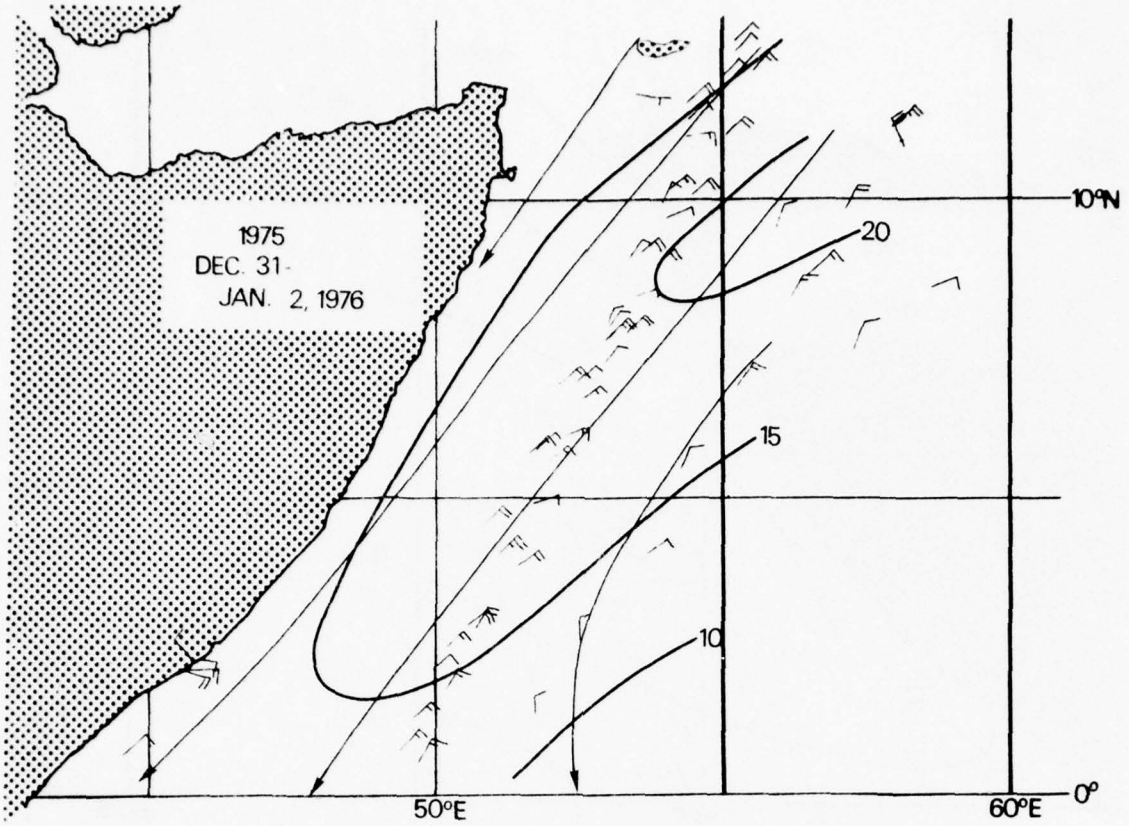

1975
DEC. 16-18
15
10°N
15
10
50°E
60°E
0°


1975
DEC. 19-21
25
20
15
10
10°N
0°
50°E
60°E


1975
DEC. 22-24
10
15
20
25
15
10
10°N
0°
50°E
60°E


1975
DEC. 25-27
10
15
20
25
20
15
10°N
50°E
60°E
0°

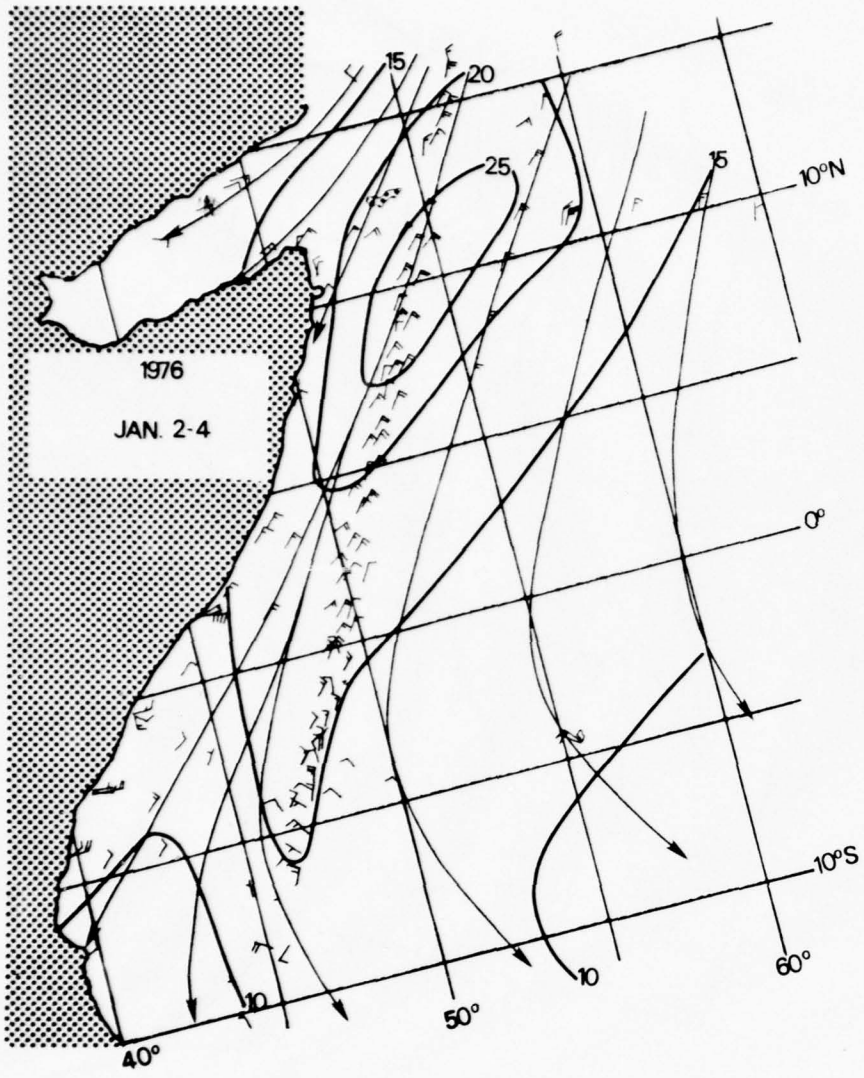

1975
DEC. 28-30
10°N
20
15
10
50°E
60°E
0°

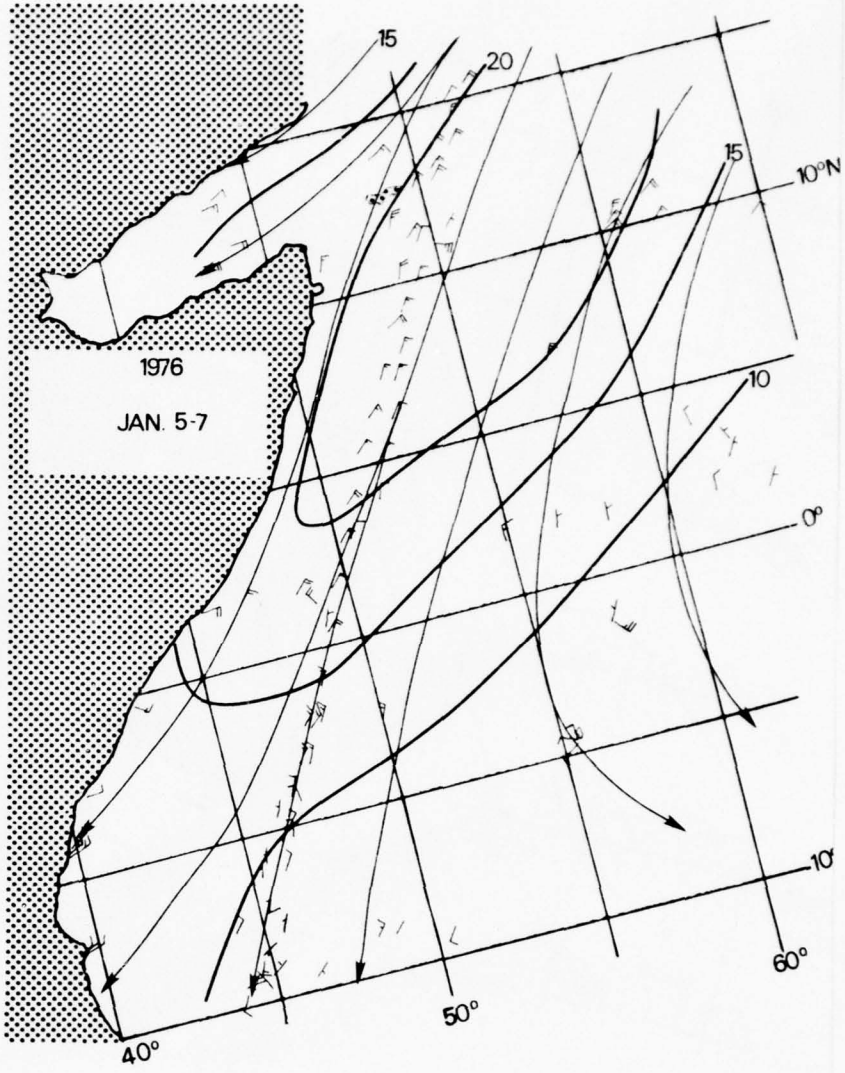

1975
DEC. 31-
JAN. 2, 1976
10°N
20
15
10
50°E
60°E
0°

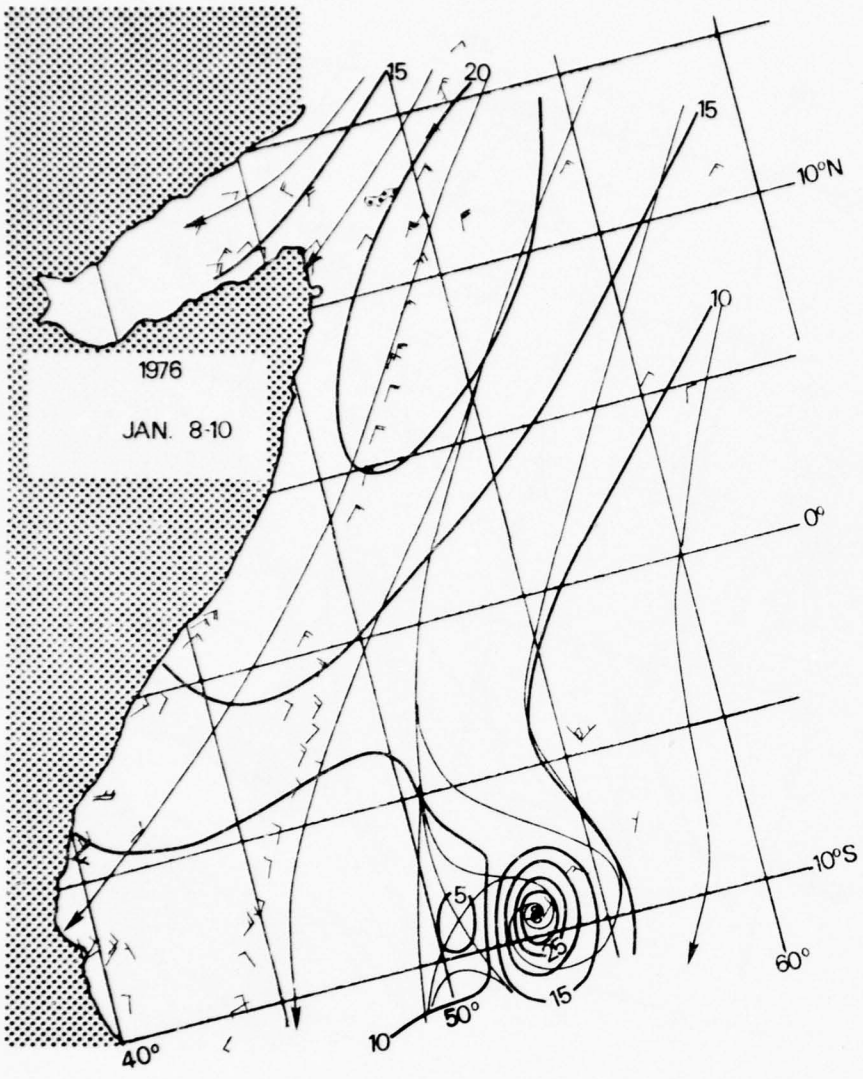
# P A R T  B

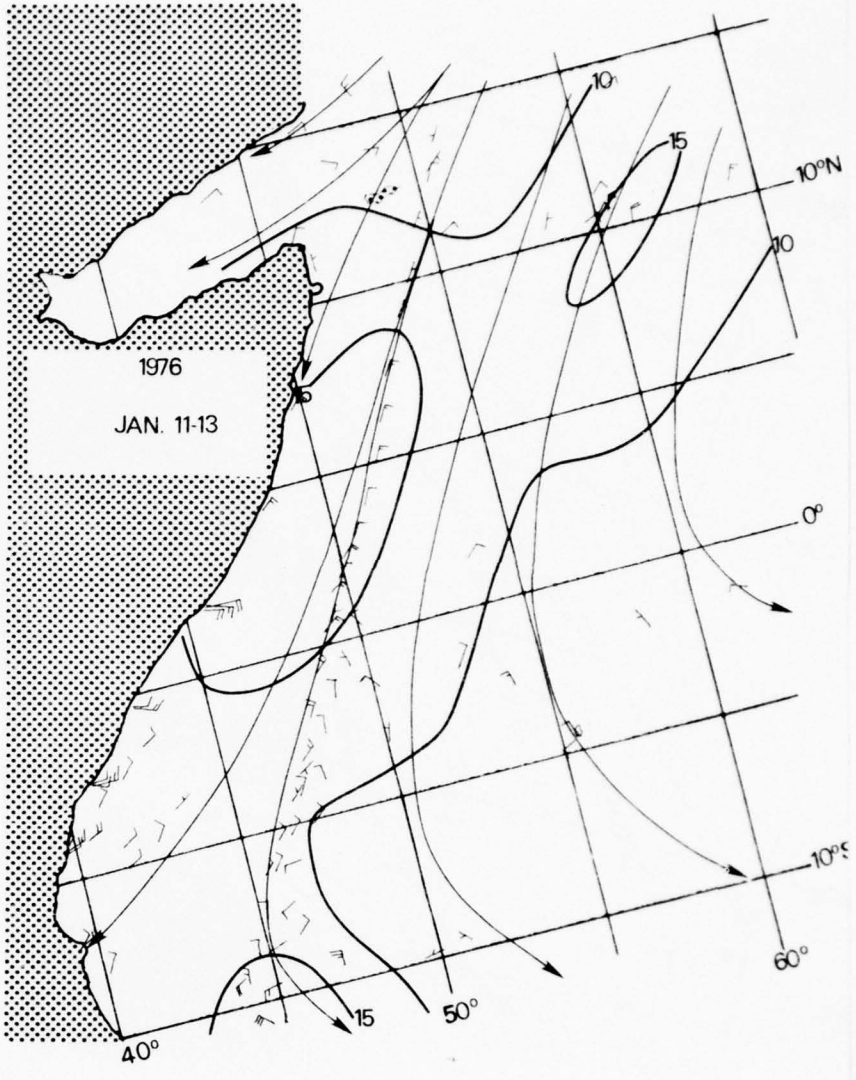
## SURFACE WIND MAPS

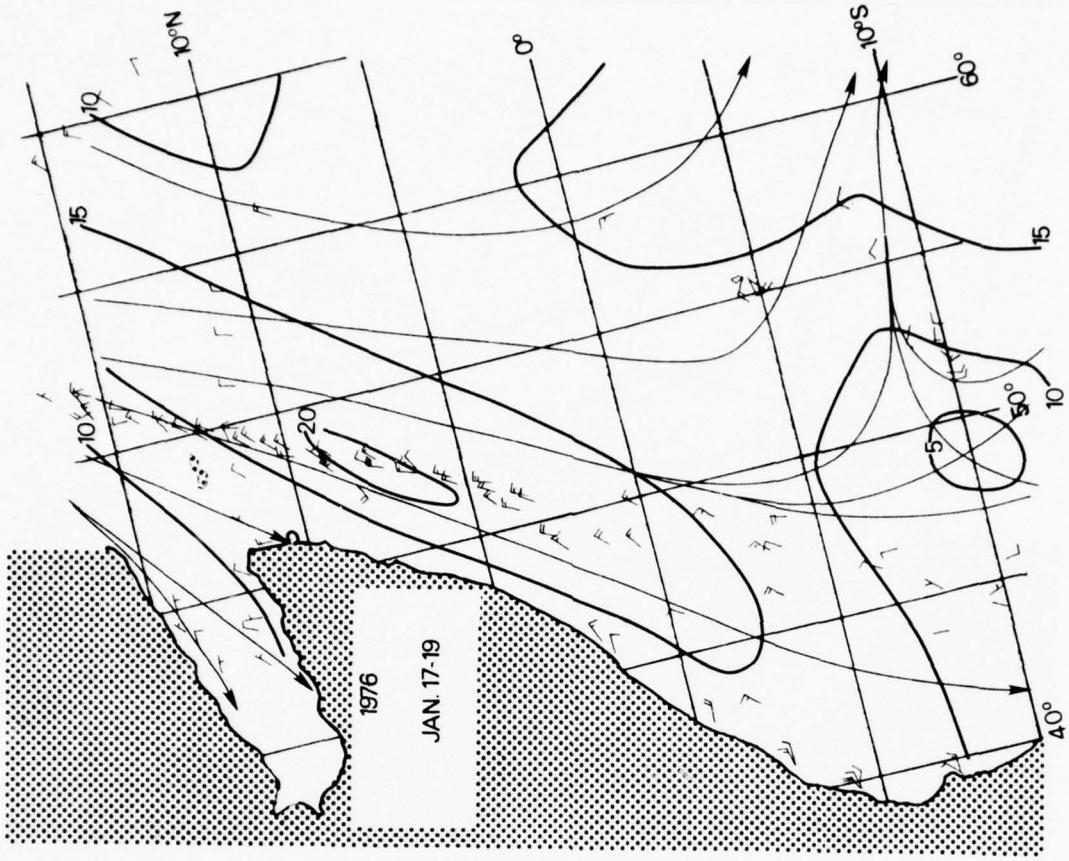
## January to October 1976

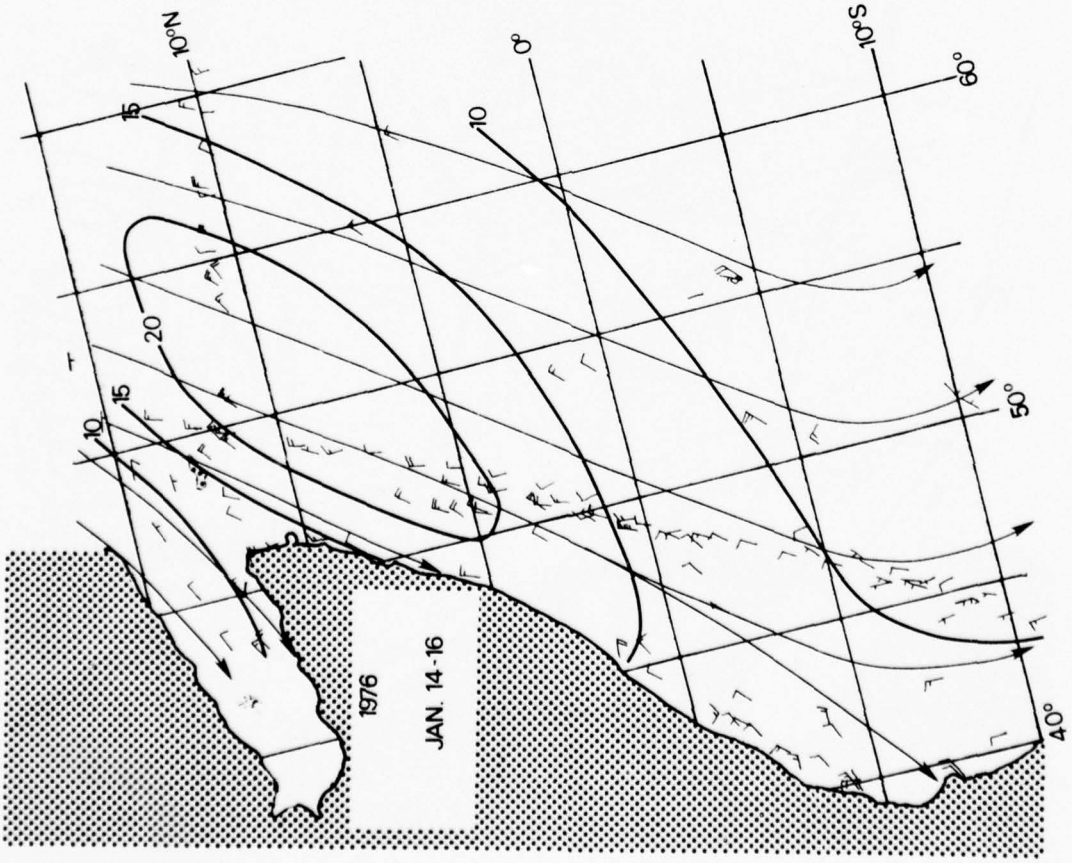

1976
JAN. 2-4
15
20
25
15
10°N
0°
10°S
10
10
50°
60°
40°

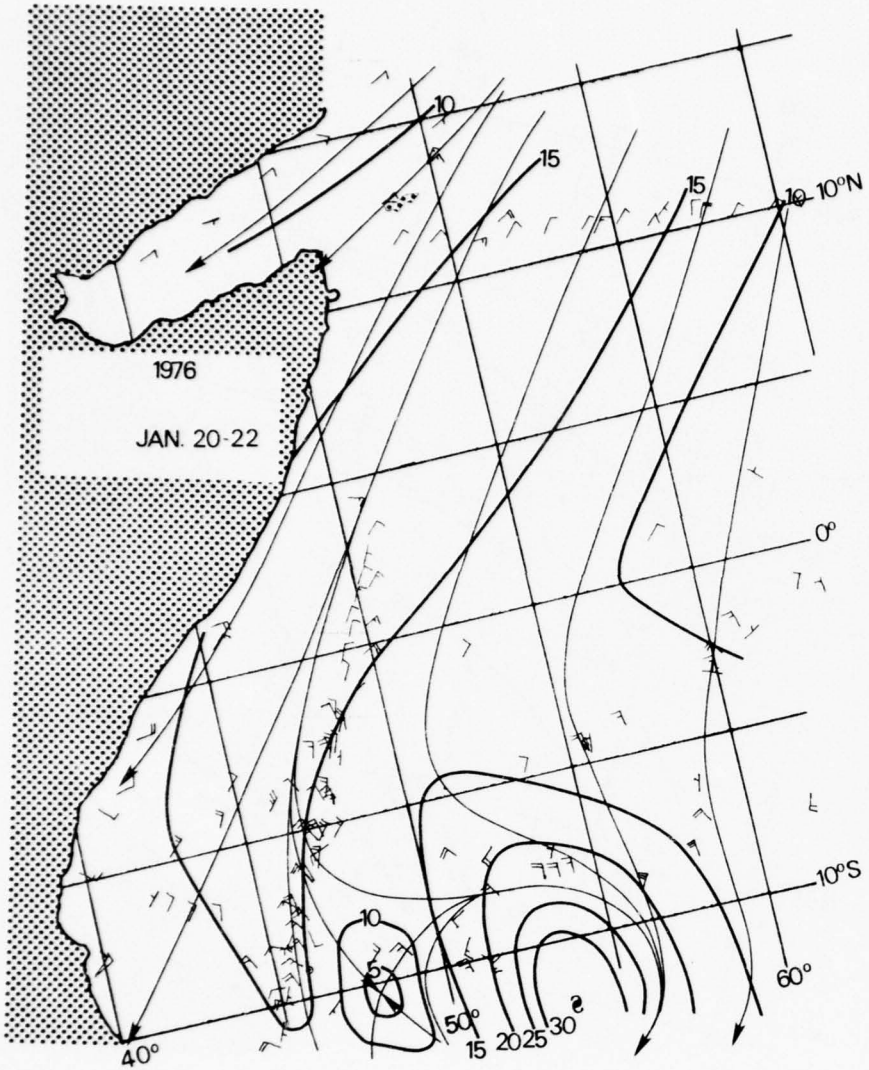

1976
JAN. 5-7
15
20
15
10°N
10
0°
50°
60°
40°

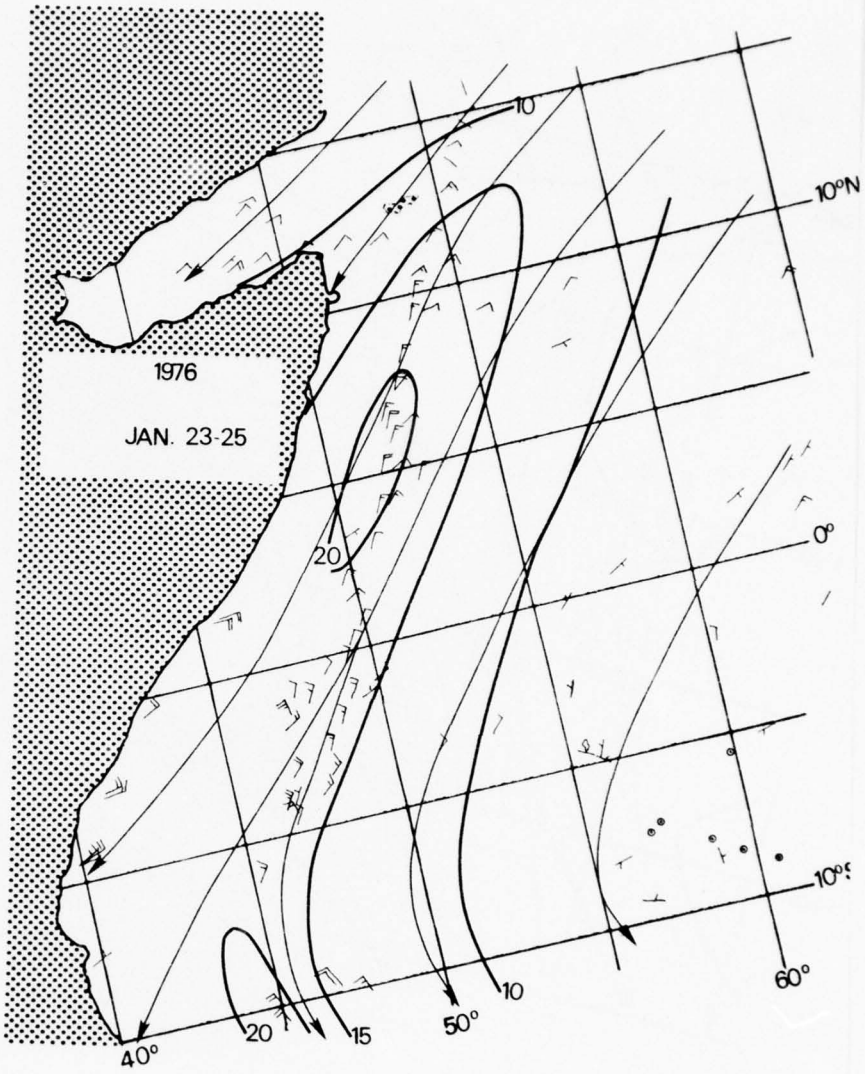

1976
JAN. 8-10
15
20
15
10
10°N
0°
10°S
60°
50°
40°
10
5
15

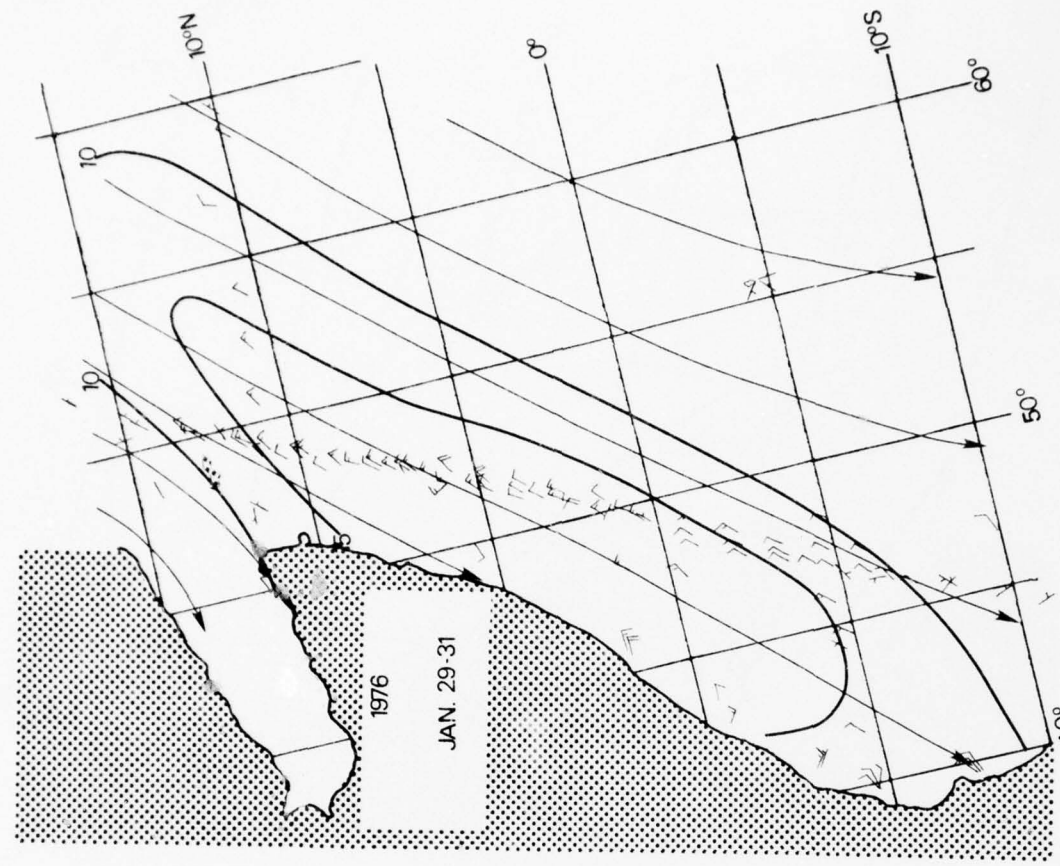

1976
JAN. 11-13
10
15
10
10°N
0°
60°
50°
40°
15

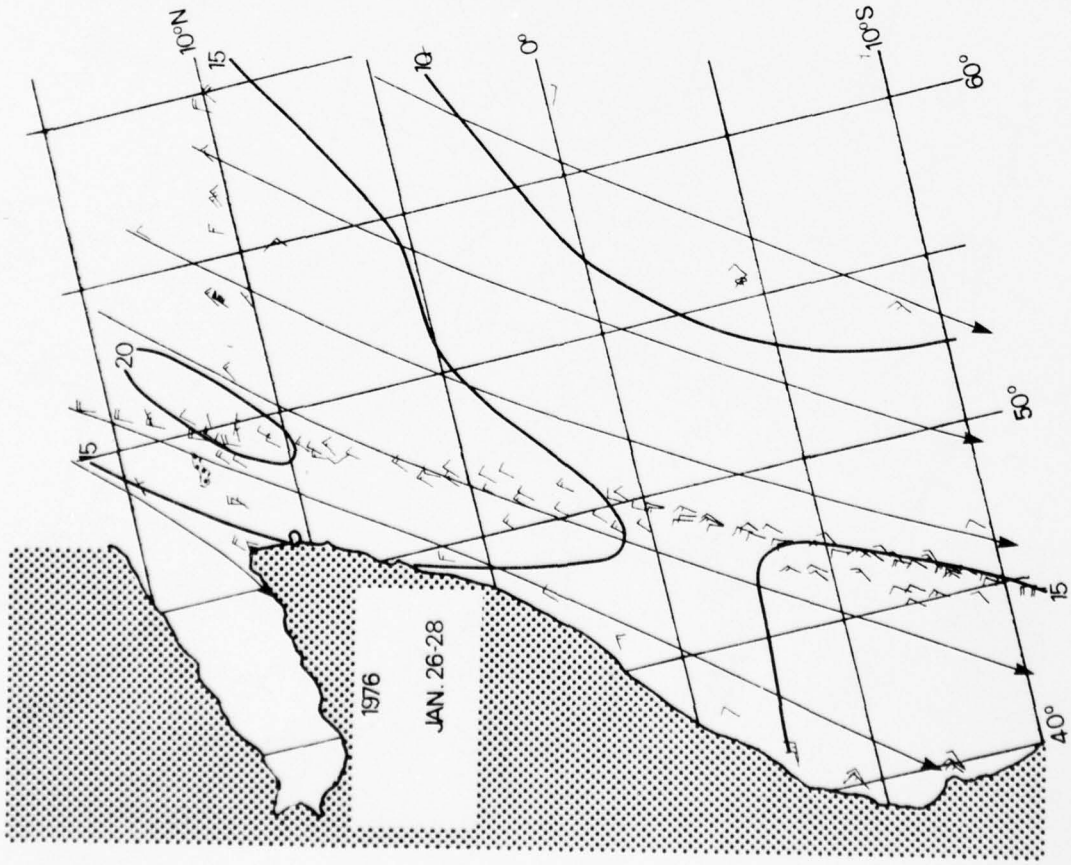

10°N
0°
10°S
60°
50°
40°
10
15
20
5
1976
JAN. 17-19

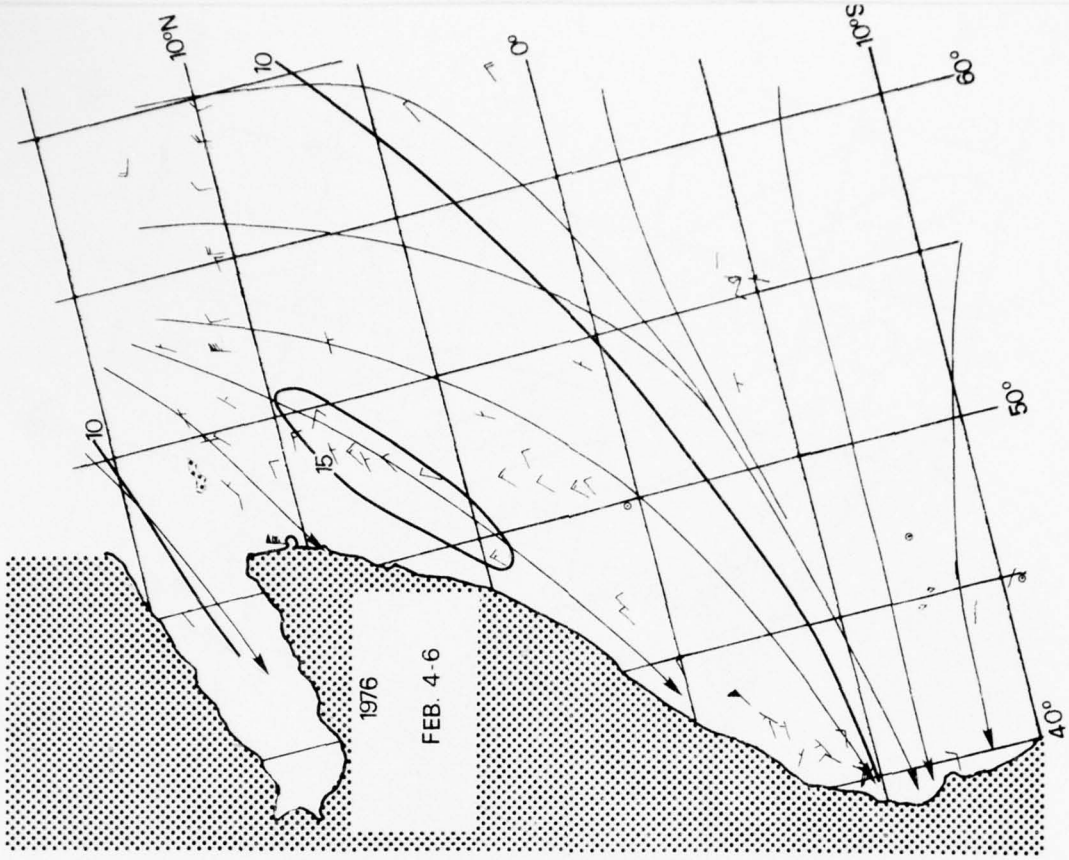

10°N
0°
10°S
60°
50°
40°
10
15
20
1976
JAN. 14-16

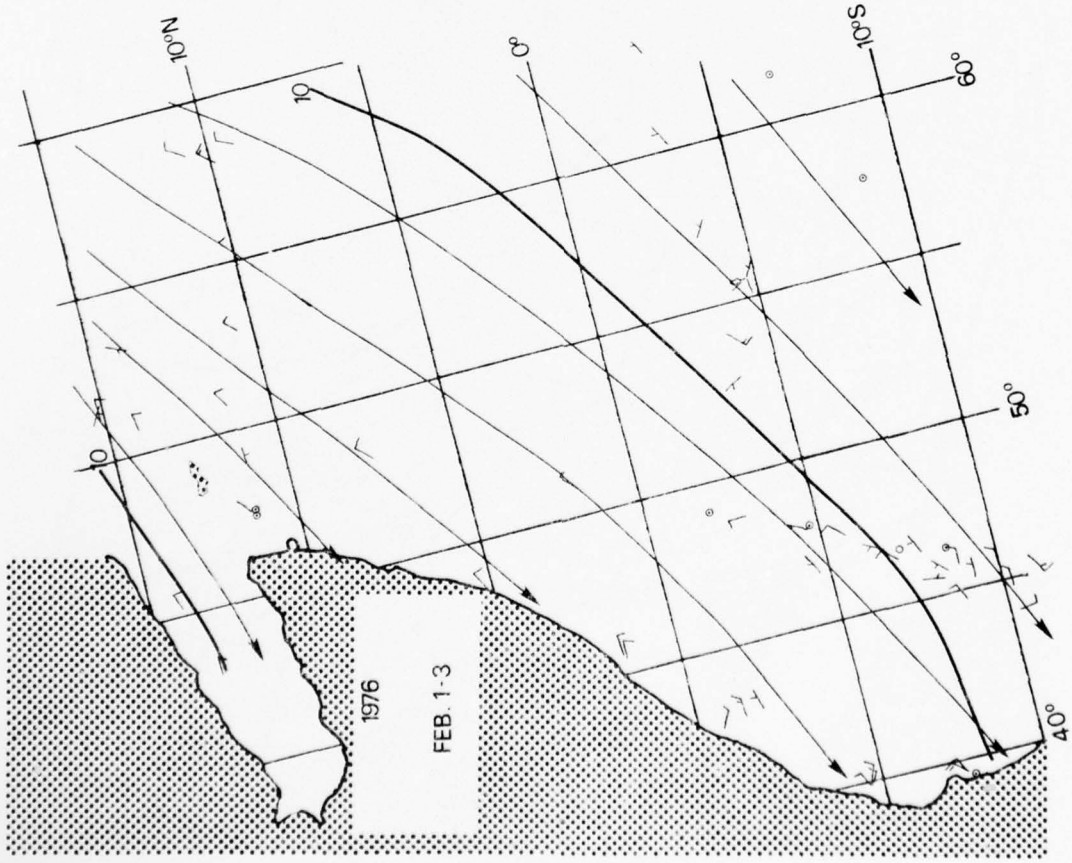

1976
JAN. 20-22
10
15
15
10
10°N
0°
10°S
60°
40°
10
5
50°
15
20
25
30

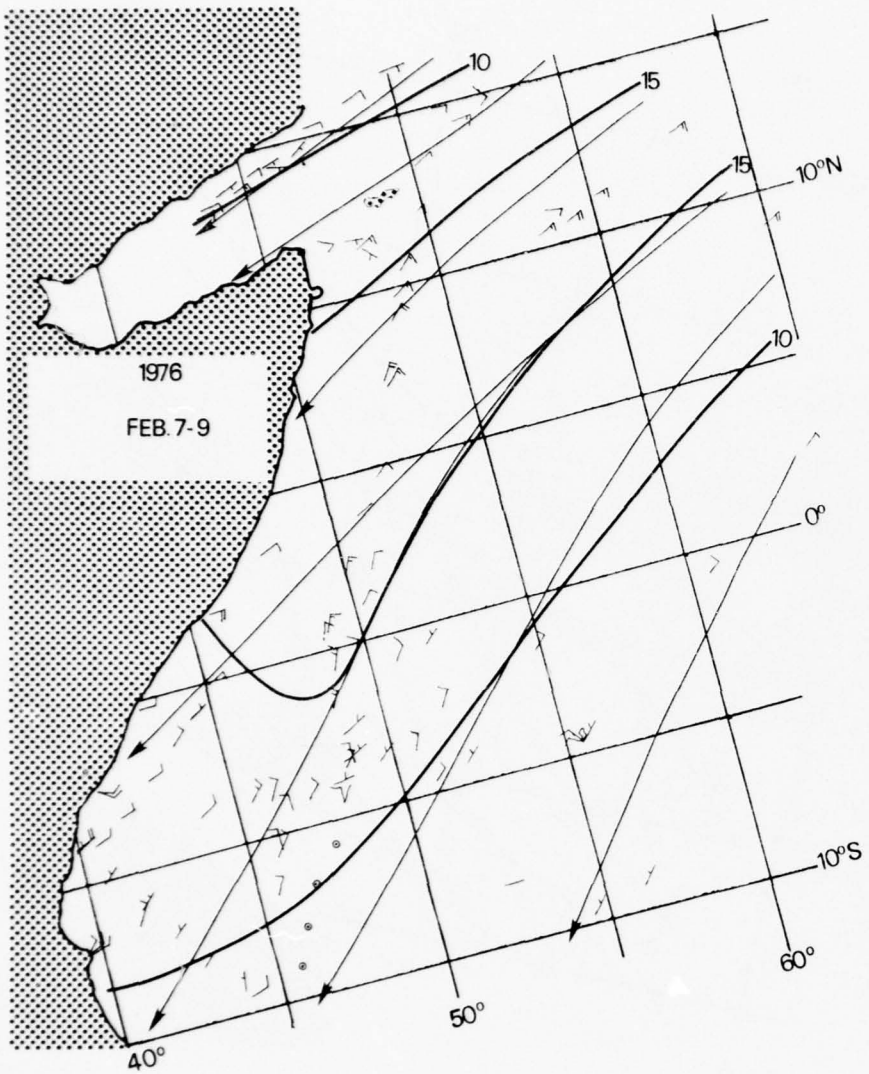

1976
JAN. 23-25
10
10°N
20
0°
10°S
60°
40°
20
15
50°
10

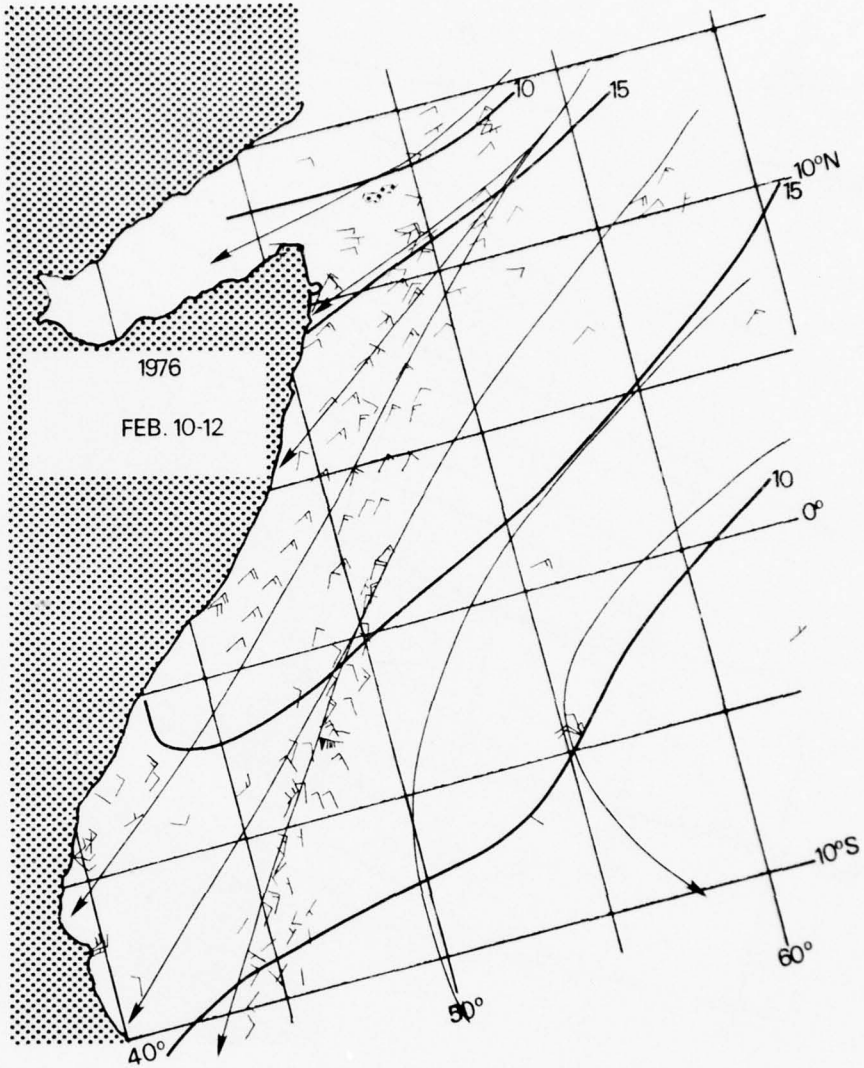

10°N
0°
10°S
60°
50°
40°
10
10
1976
JAN. 29-31

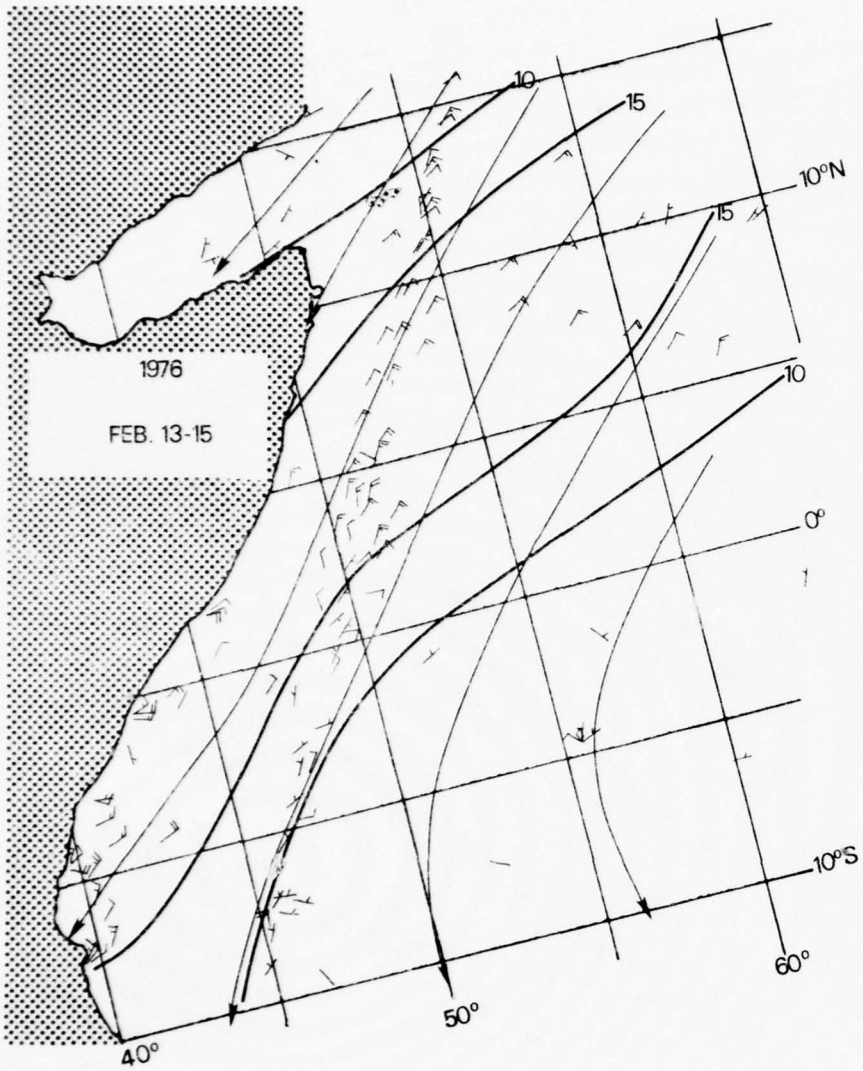

10°N
0°
10°S
60°
50°
40°
15
20
15
10
15
1976
JAN. 26-28

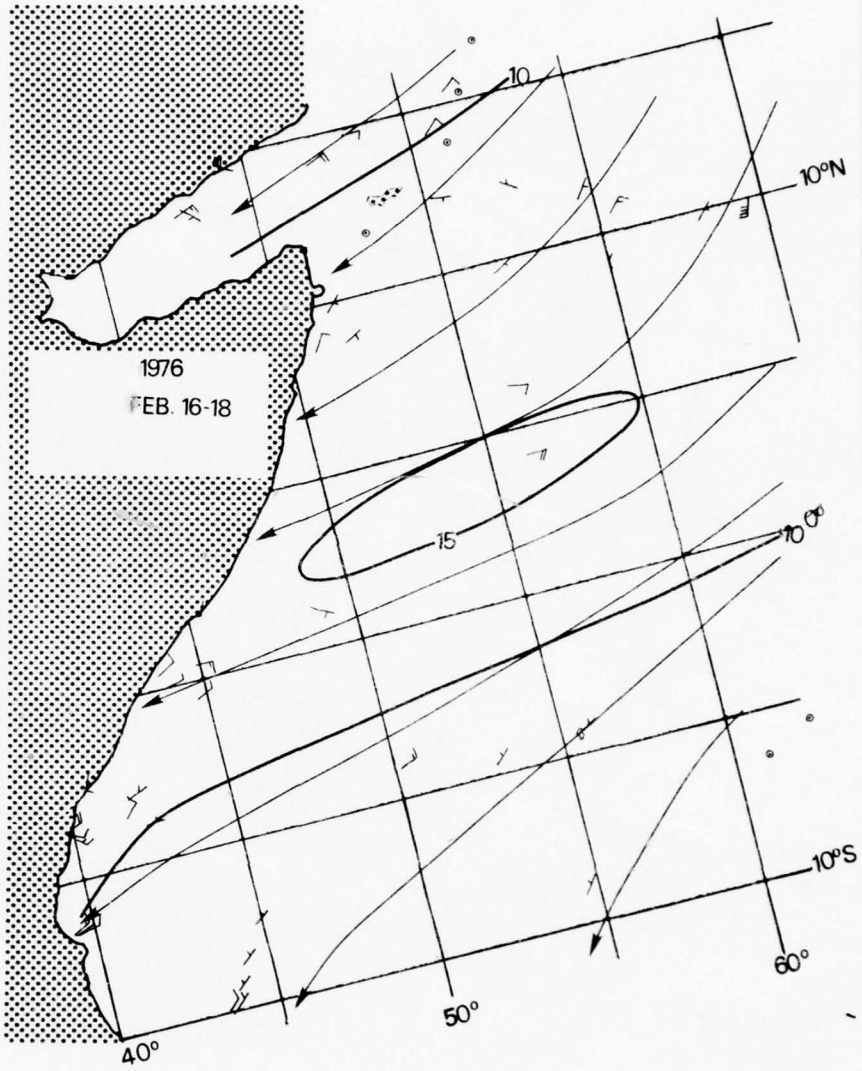

10°N
10
0°
10°S
60°
50°
40°
10
15
1976
FEB. 4-6

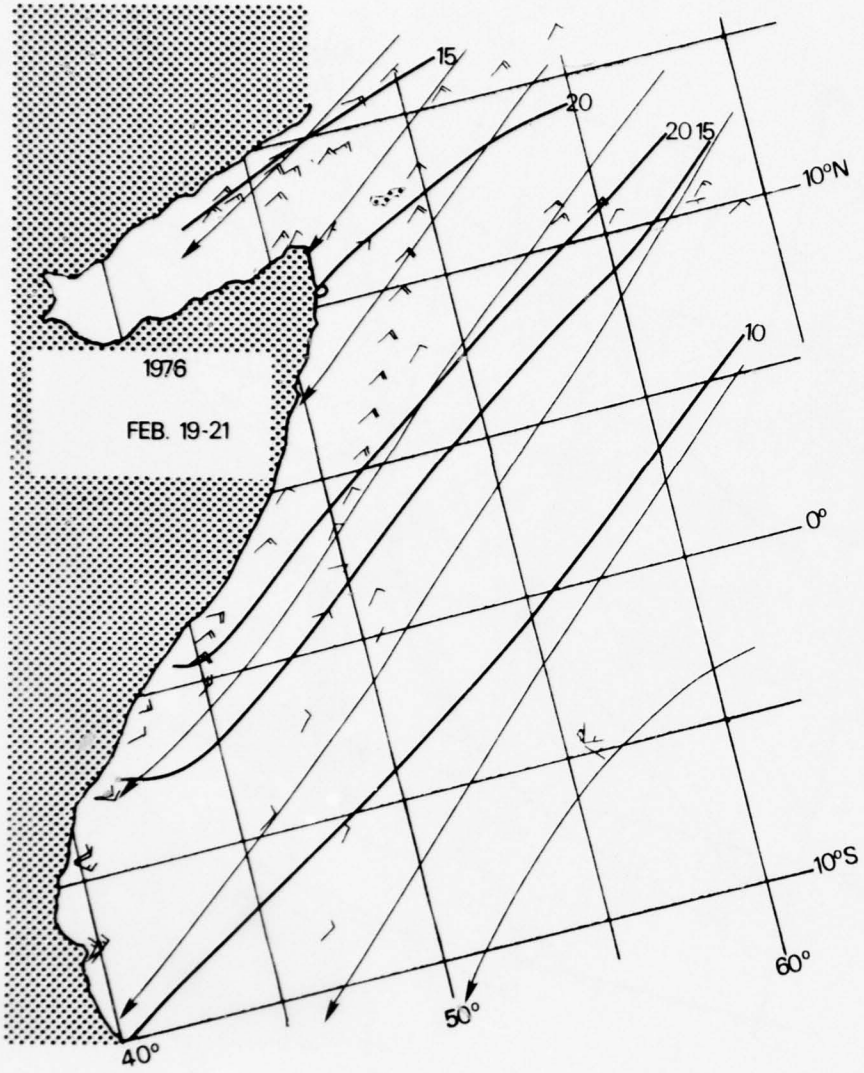

10°N
10
0°
10°S
60°
50°
40°
10
1976
FEB. 1-3

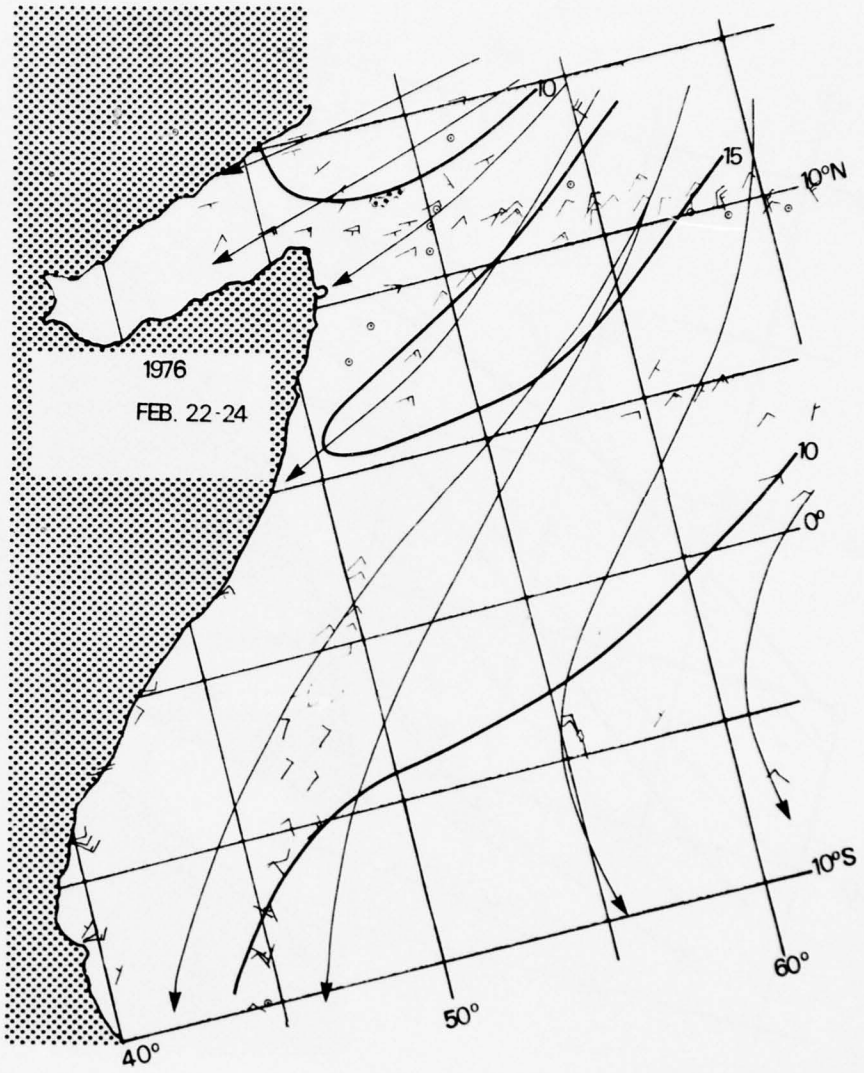

10
15
15
10°N
10
1976
FEB. 7-9
0°
10°S
60°
50°
40°

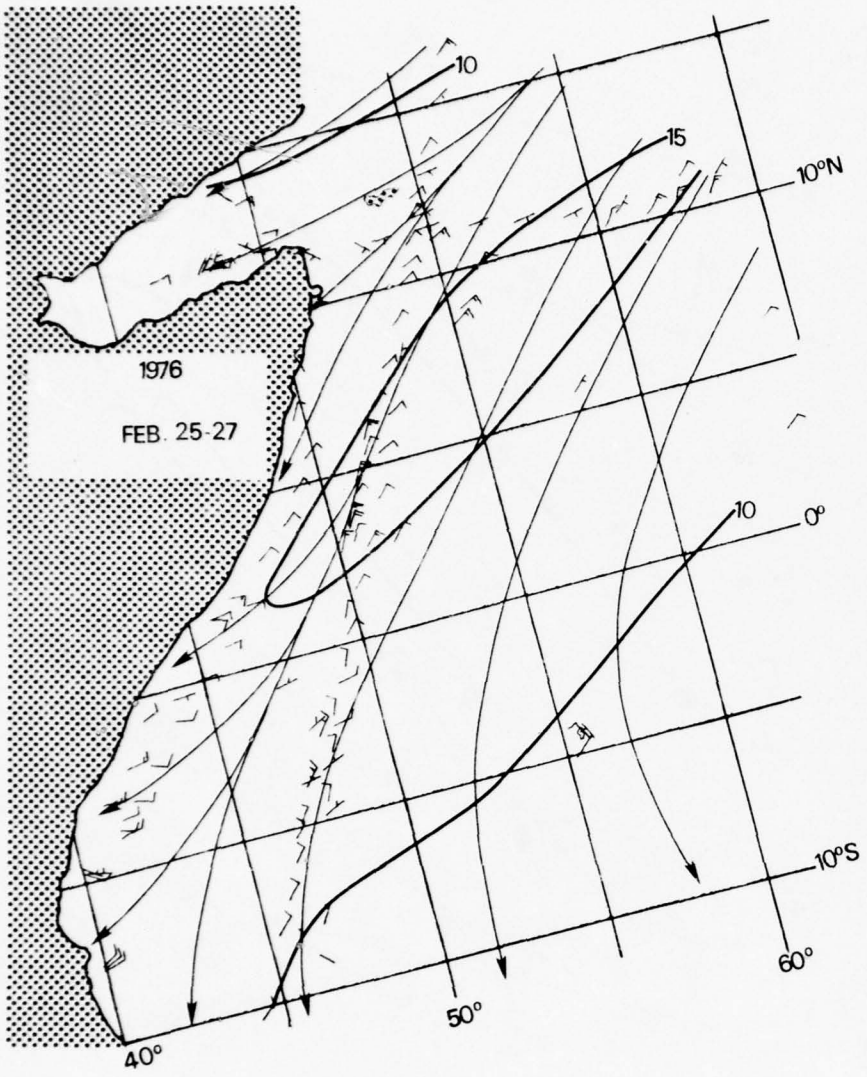

10
15
10°N
15
1976
FEB. 10-12
10
0°
10°S
60°
50°
40°

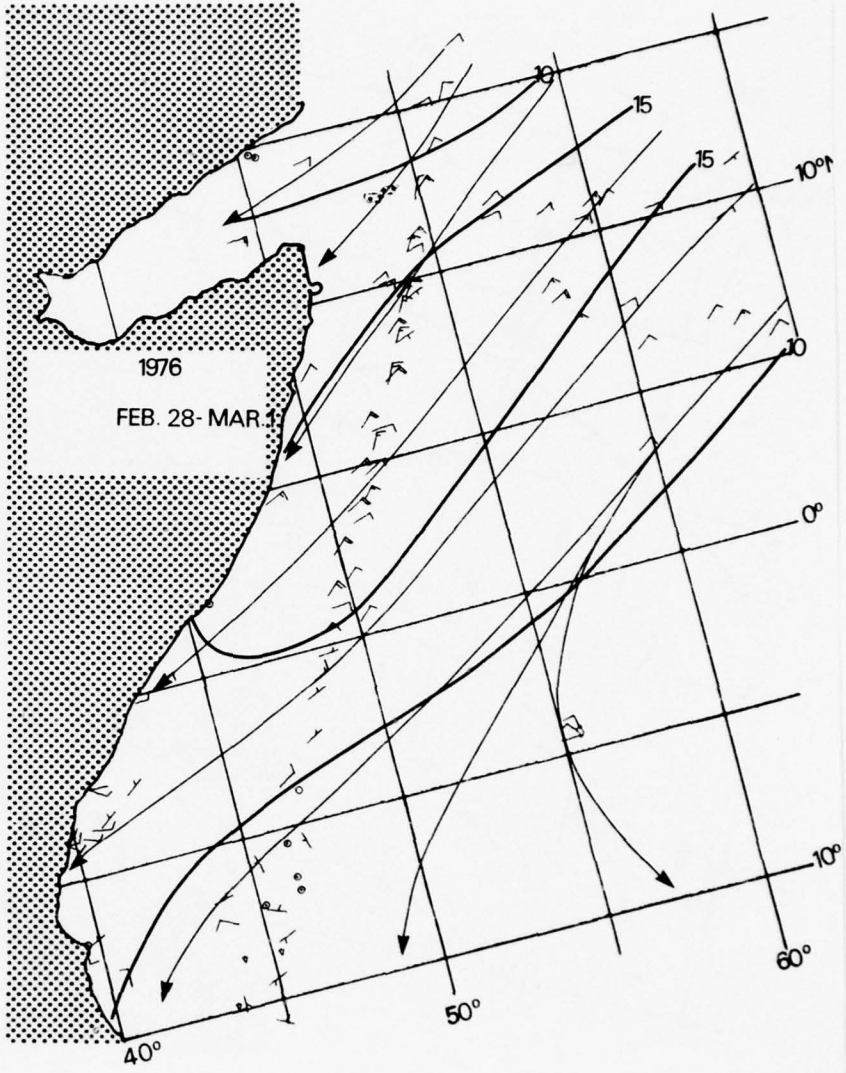

1976
FEB. 13-15
10
15
10°N
15
10
0°
10°S
60°
50°
40°

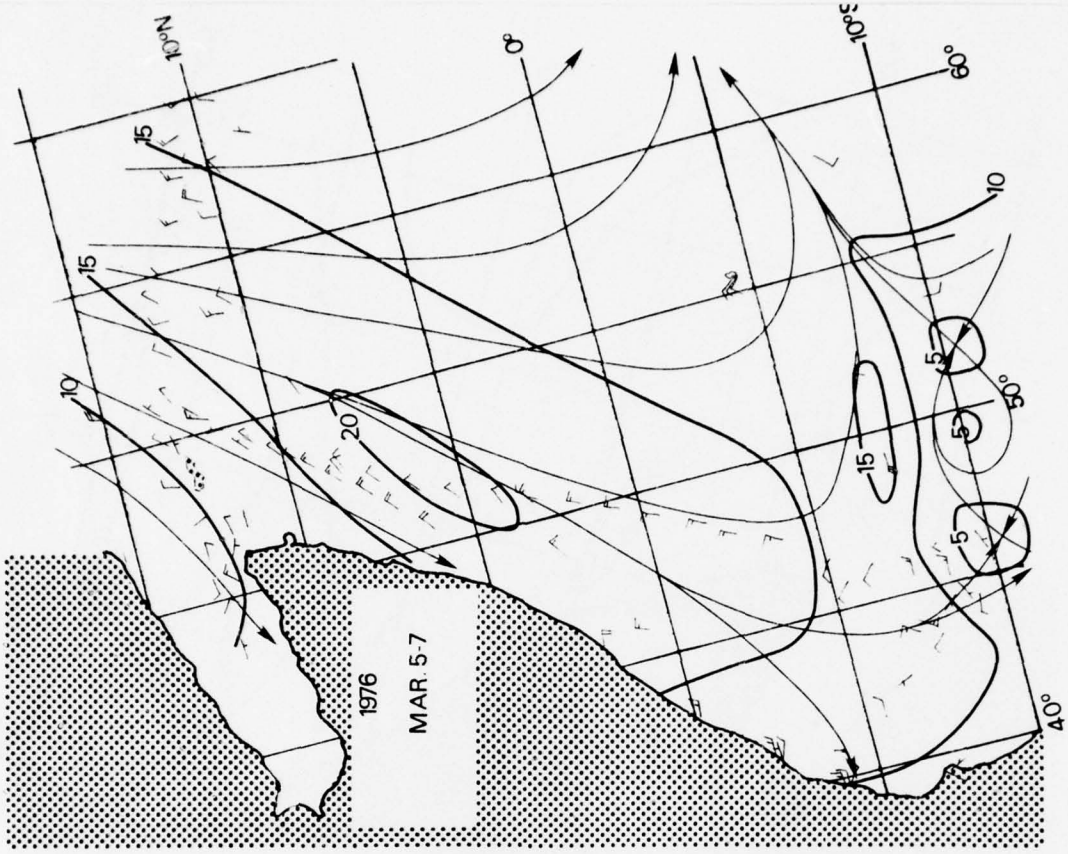

1976
FEB. 16-18
10
10°N
15
10
0°
10°S
60°
50°
40°

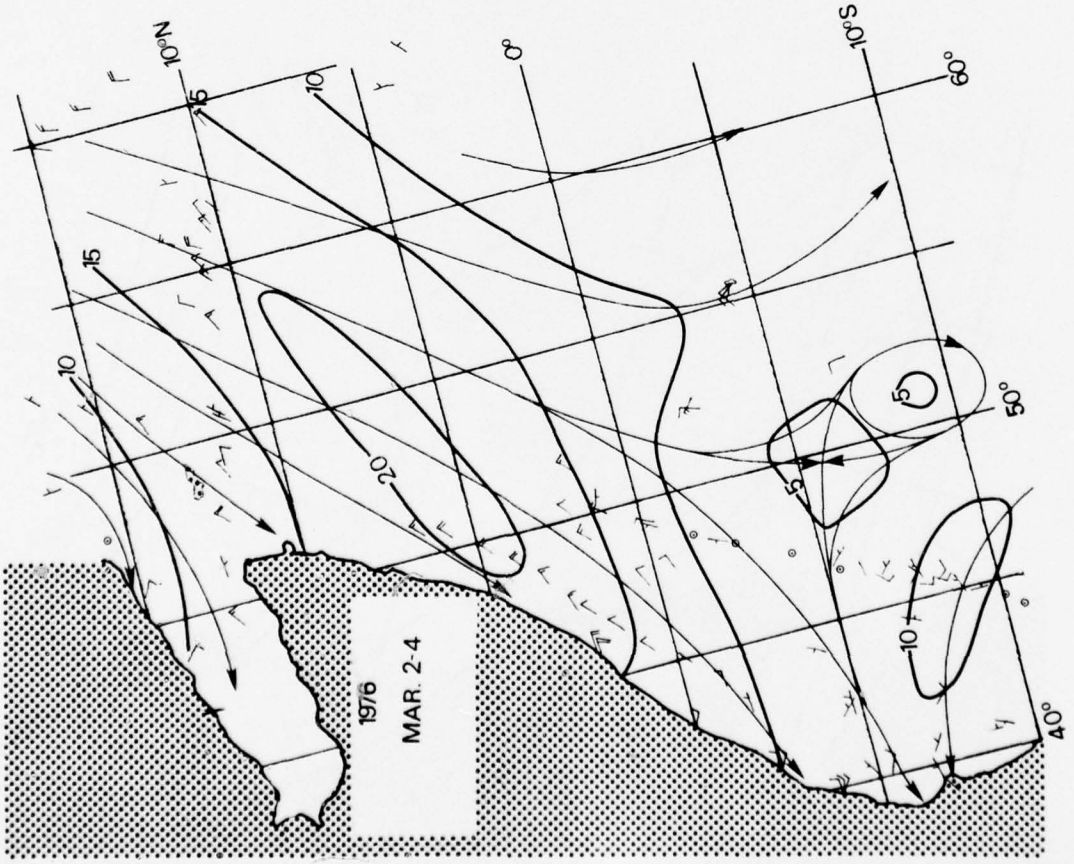

15
20
20 15
10°N
10
1976
FEB. 19-21
0°
10°S
40°
50°
60°

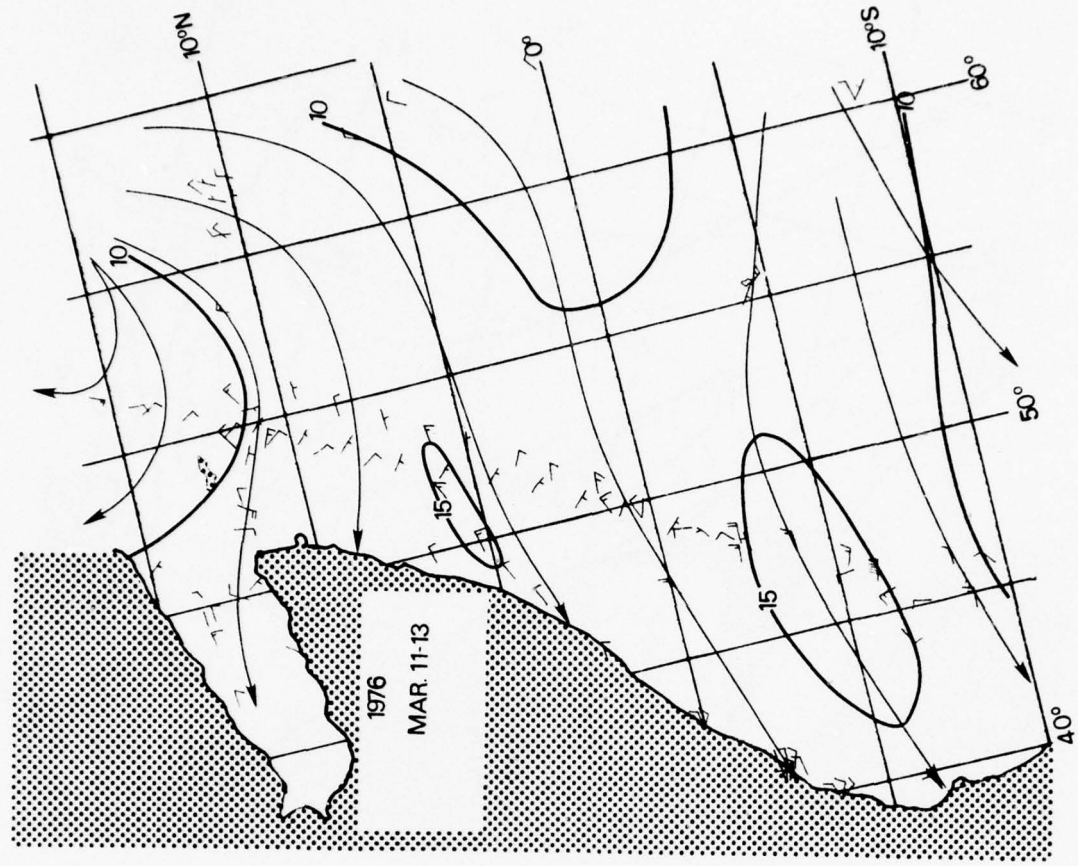

10
15
10°N
1976
FEB. 22-24
10
0°
10°S
40°
50°
60°

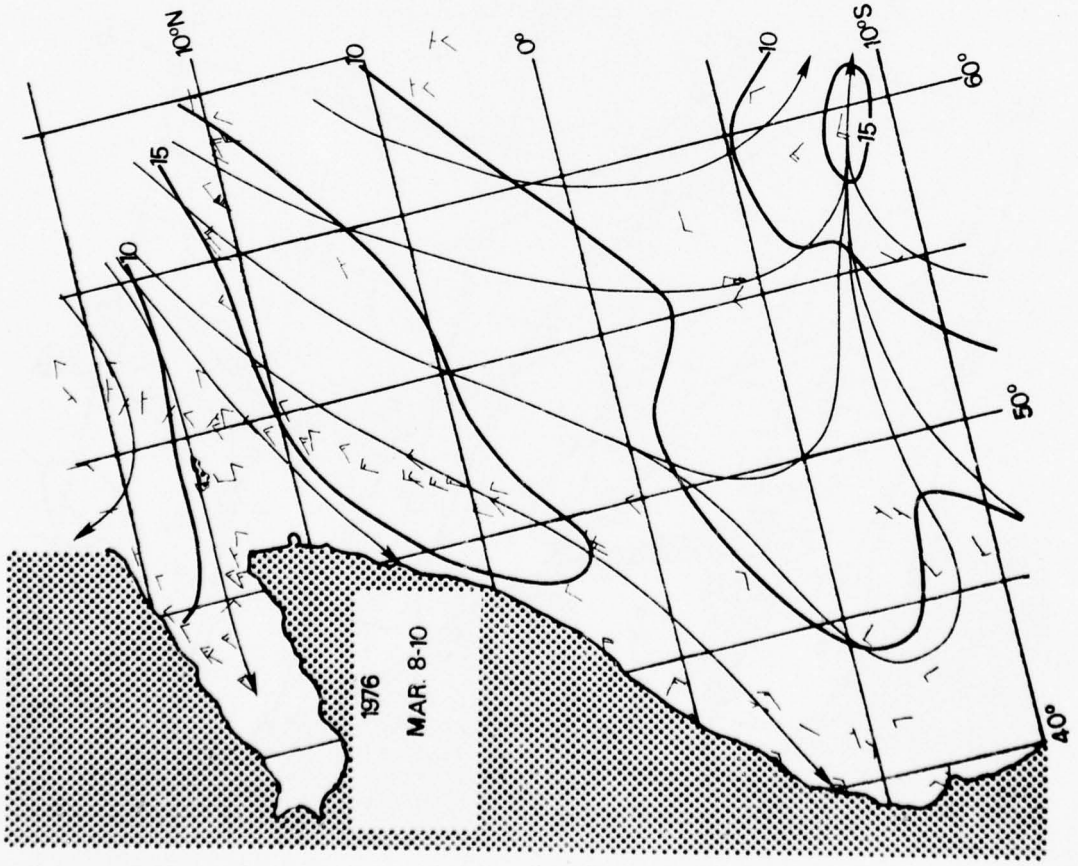

10
15
10°N
1976
FEB. 25-27
10
0°
10°S
60°
50°
40°

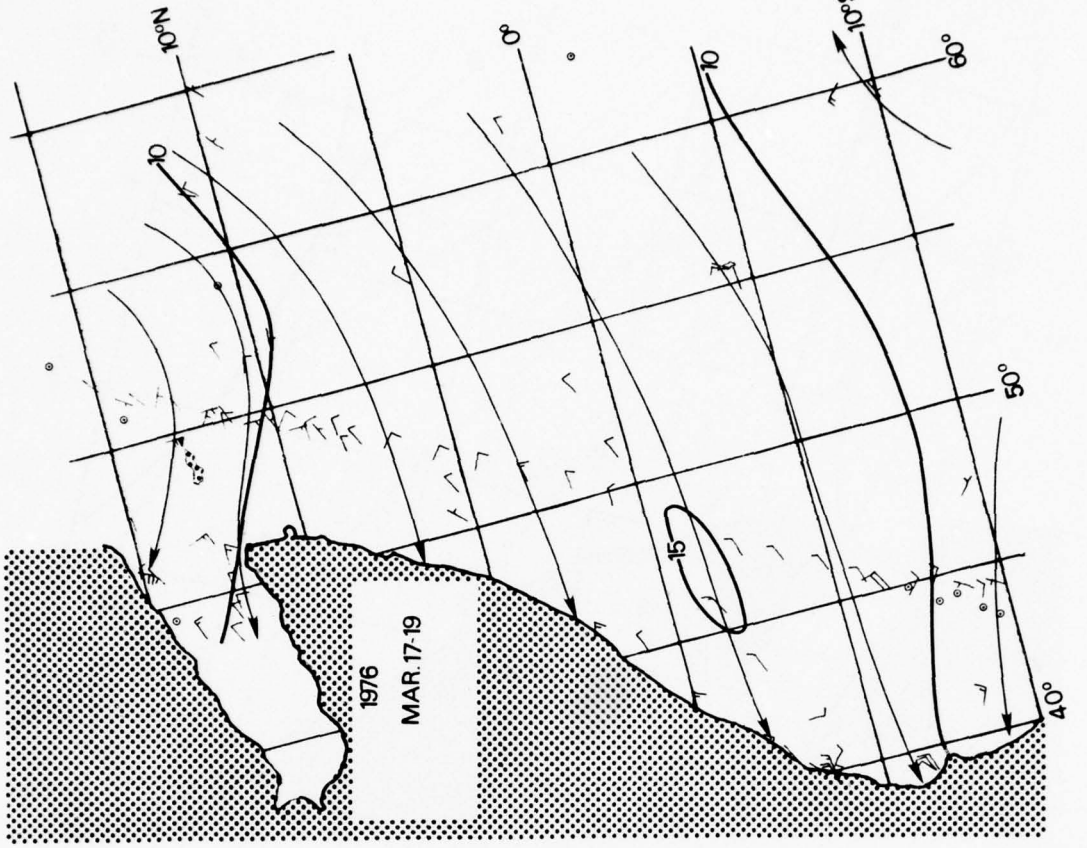

10
15
15
10°N
1976
FEB. 28- MAR. 1
10
0°
10°
60°
50°
40°

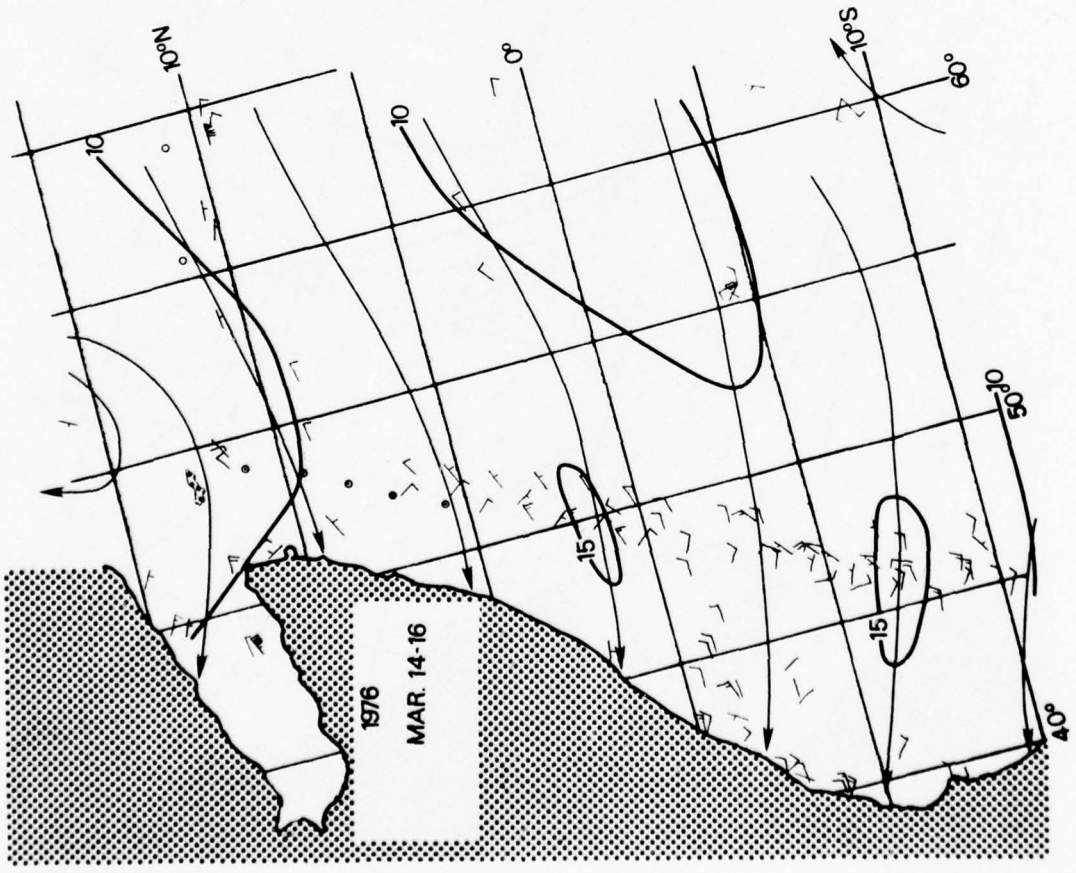

10°N
0°
10°S
60°
50°
40°
10°E
1976
MAR. 5-7

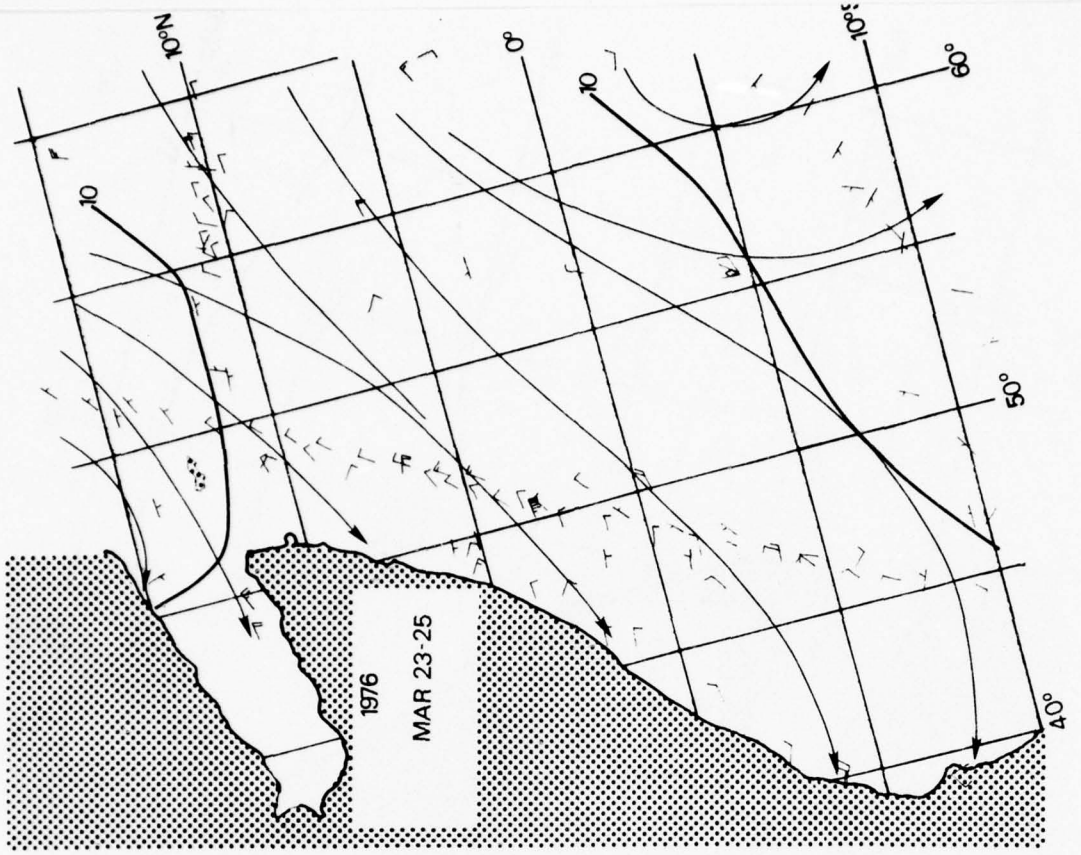

10°N
0°
10°S
60°
50°
40°
1976
MAR. 2-4

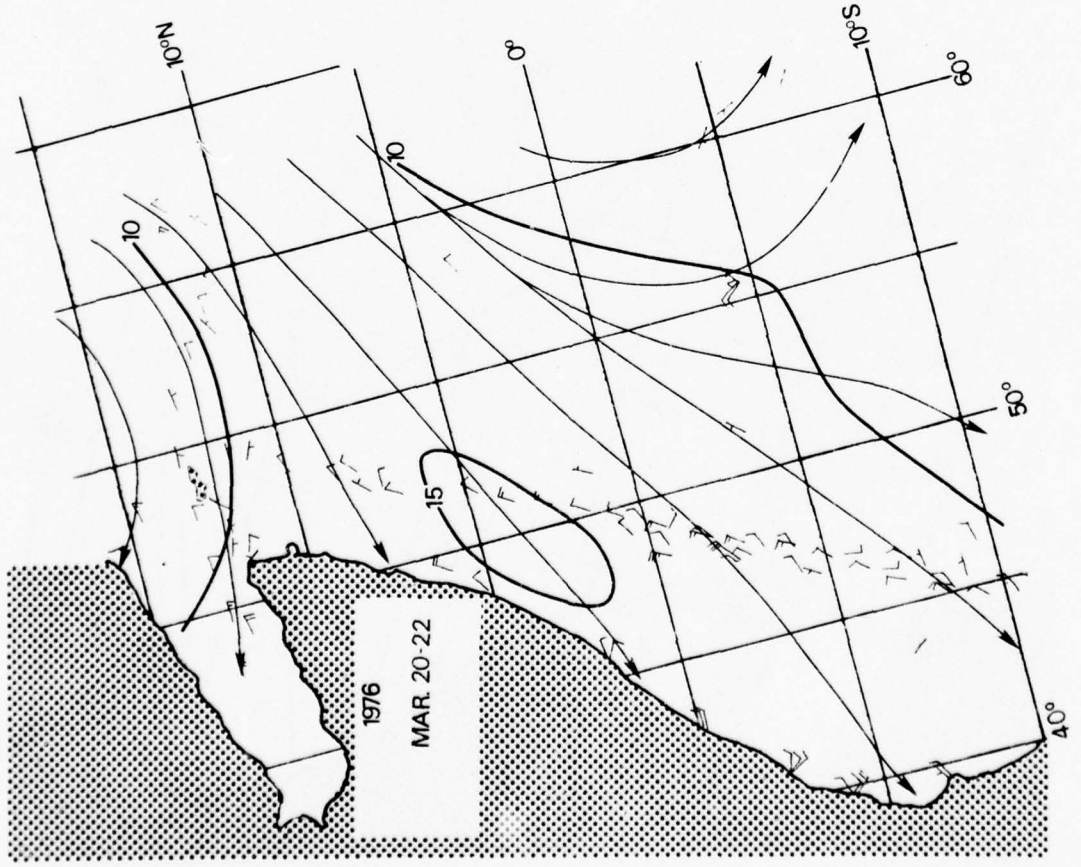

10°N
0°
10°S
60°
50°
40°
10
15
1976
MAR. 11-13

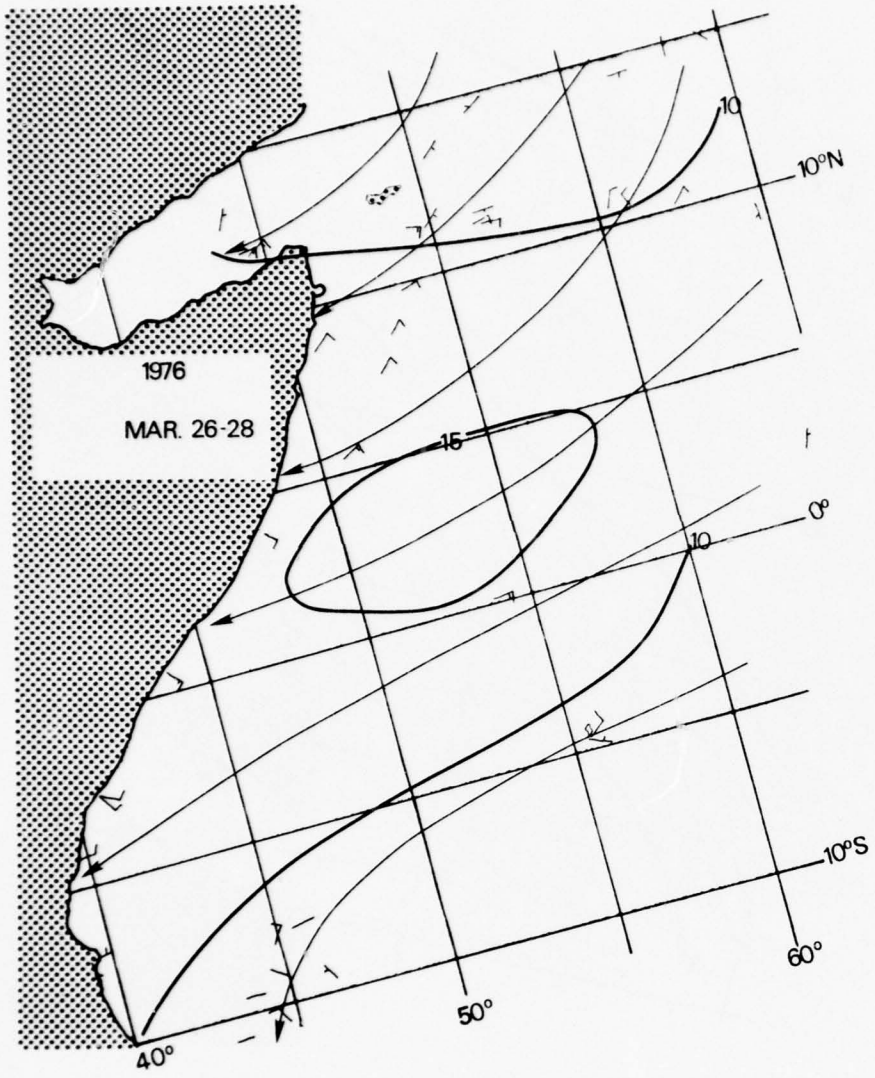

10°N
0°
10°S
60°
50°
40°
10
15
1976
MAR. 8-10

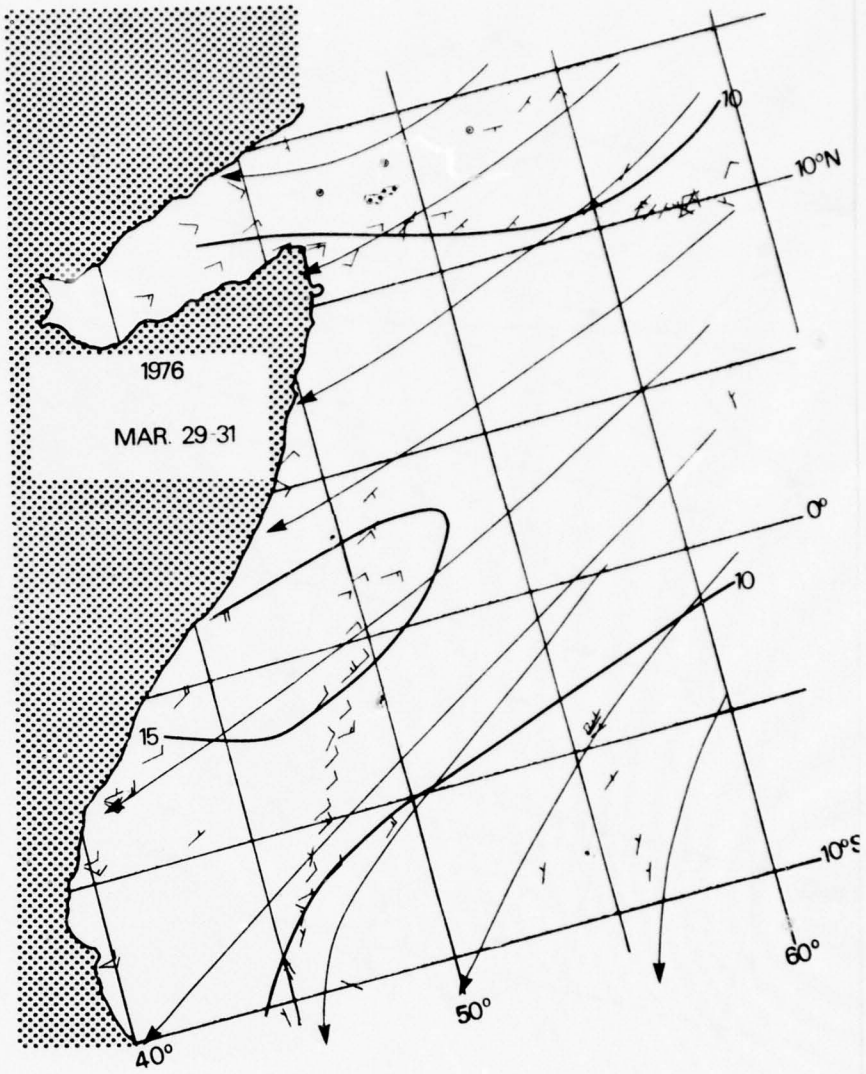

10°N
0°
10°S
80°
50°
40°
10
15
1976
MAR. 17-19

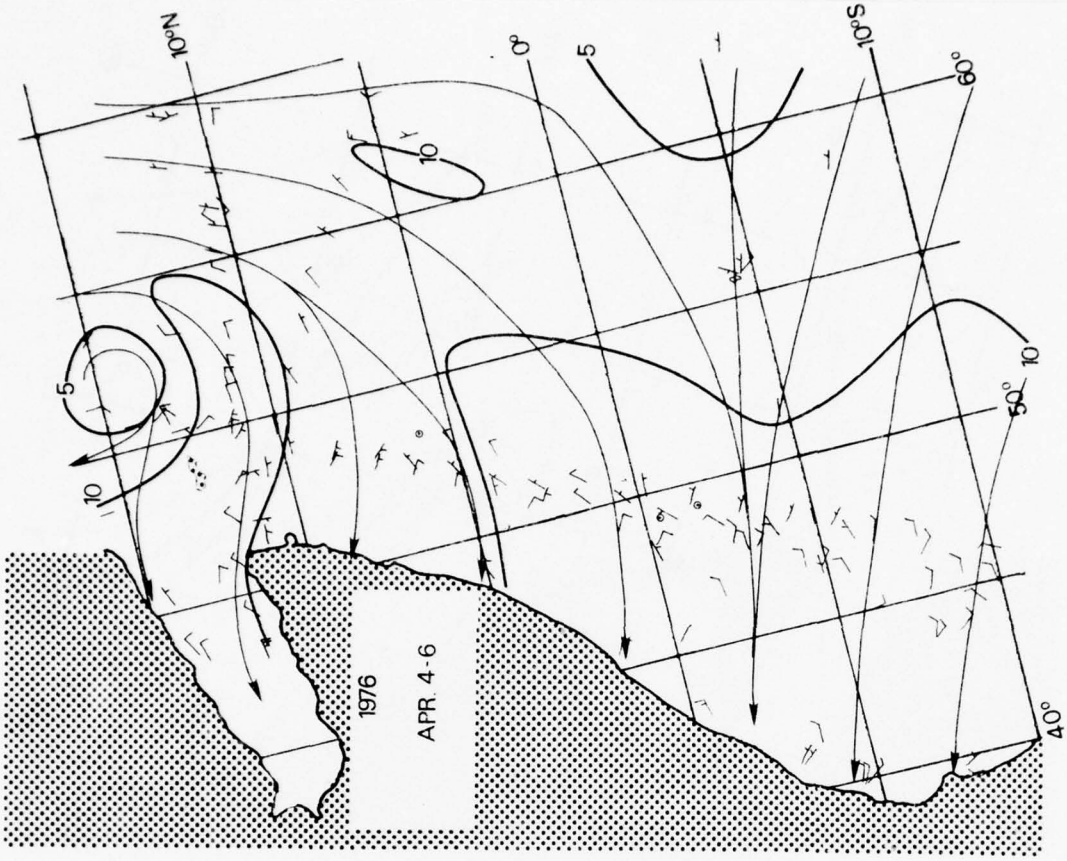

10°N
0°
10°S
80°
50°
40°
10
15
1976
MAR. 14-16

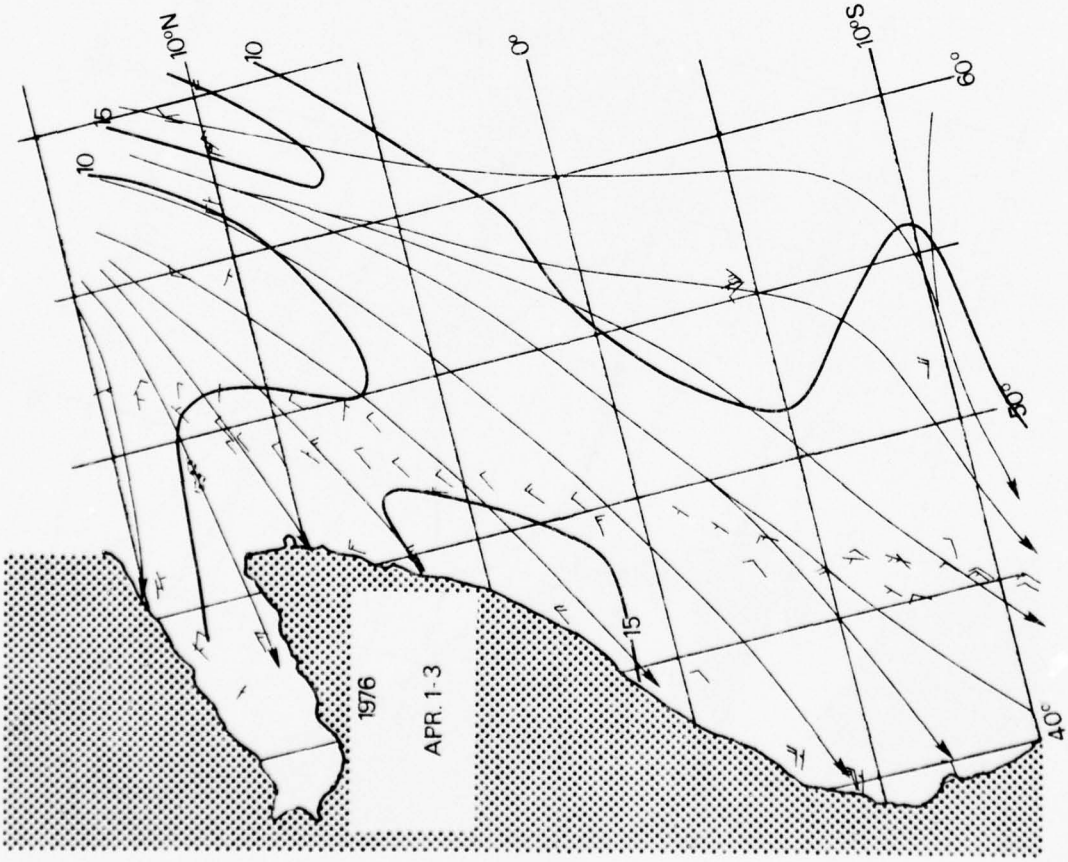

10°N
0°
10°S
80°
50°
40°
10
10
1976
MAR 23-25

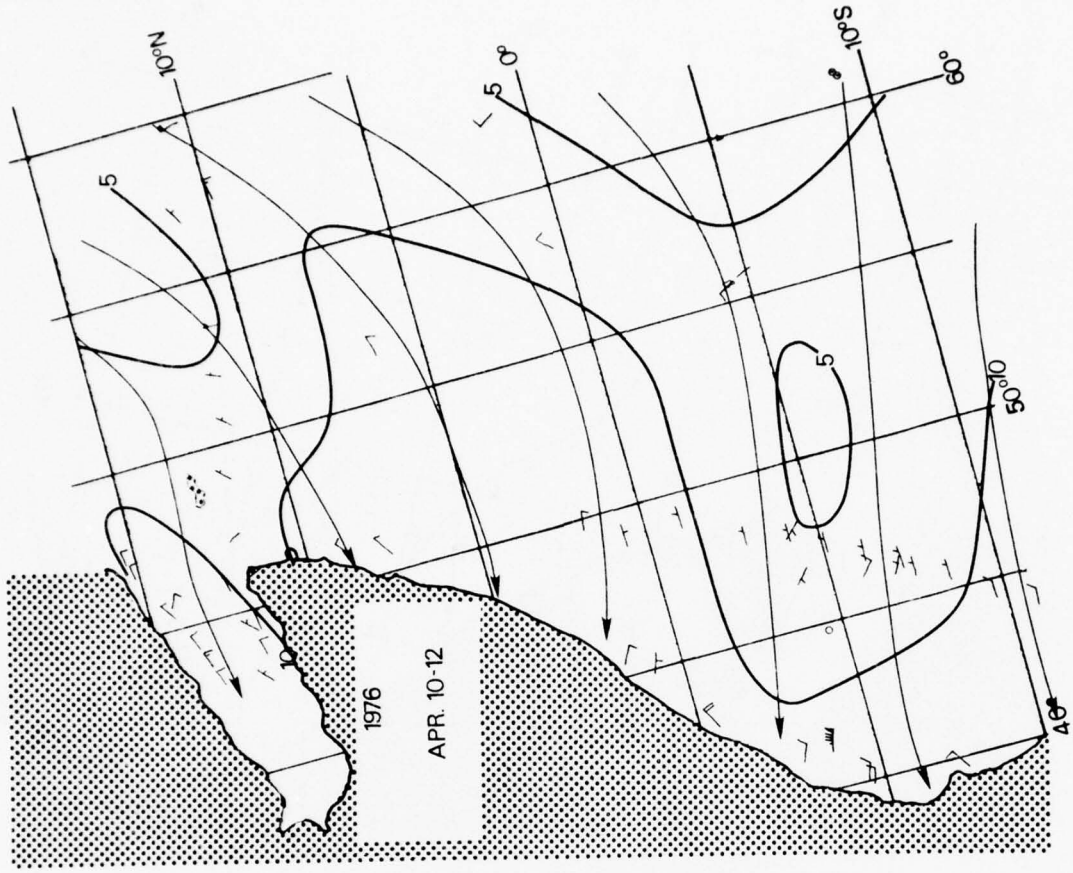

10°N
0°
10°S
60°
50°
40°
10
10
15
1976
MAR 20-22

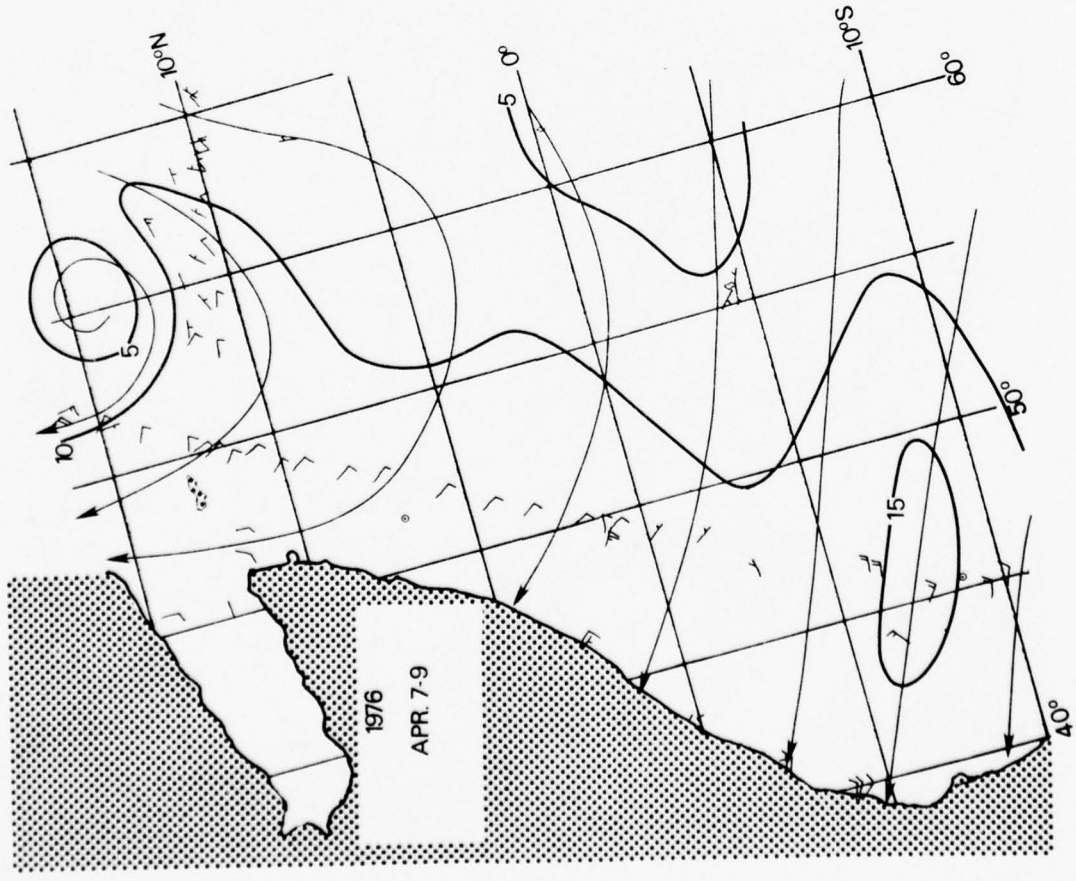

1976
MAR. 26-28
10
10°N
15
0°
10
10°S
60°
50°
40°

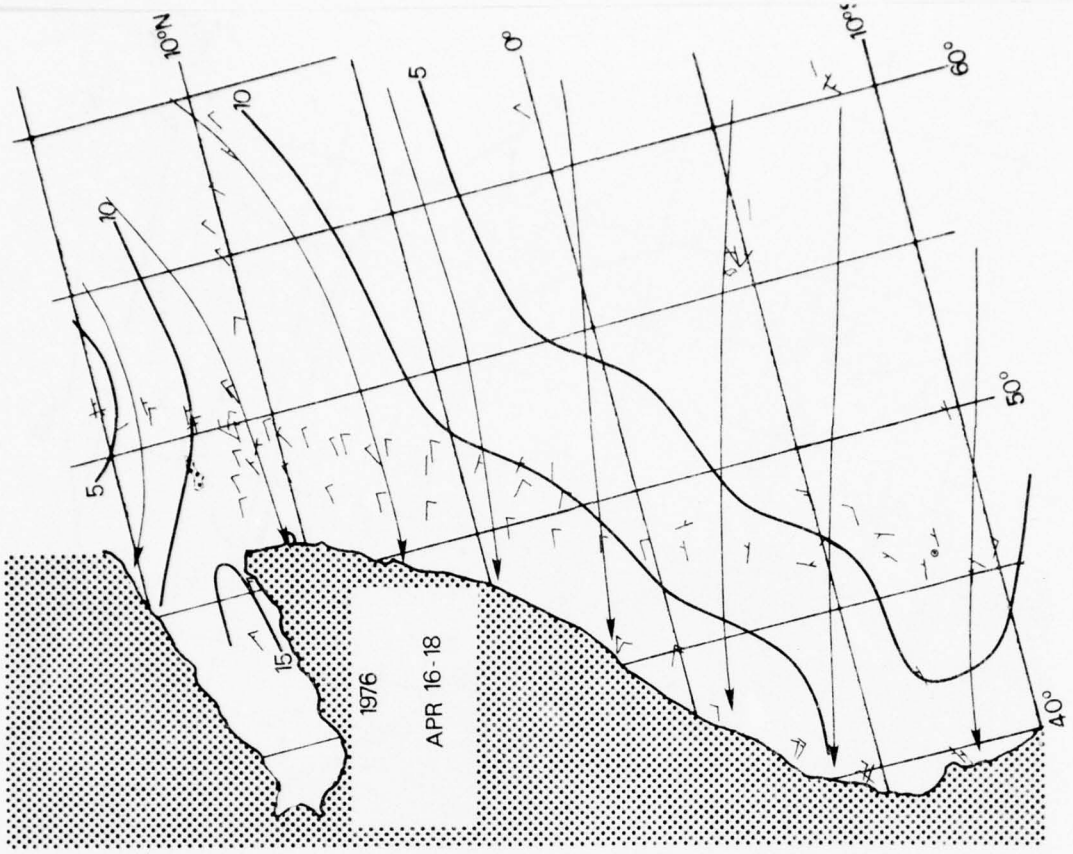

1976
MAR. 29-31
10
10°N
0°
10
15
10°S
60°
50°
40°

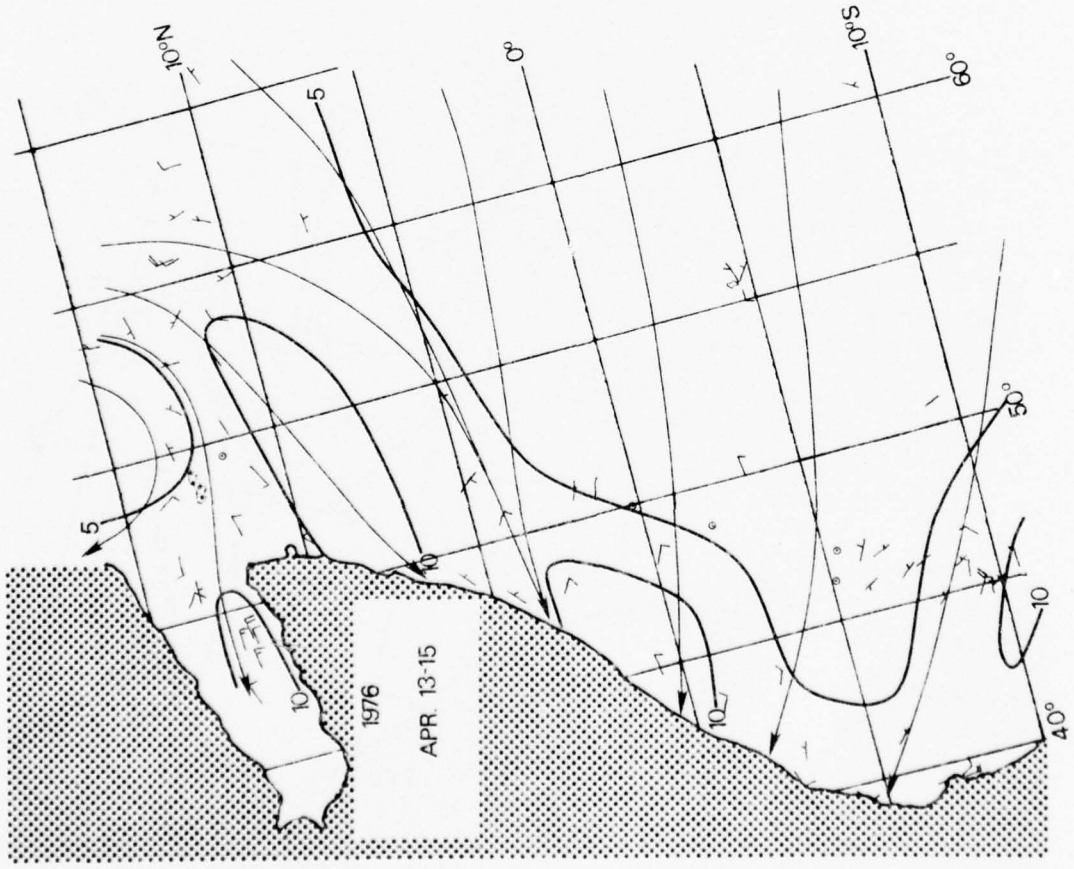

10°N
0°
10°S
60°
50°
40°
5
10
1976
APR. 4-6

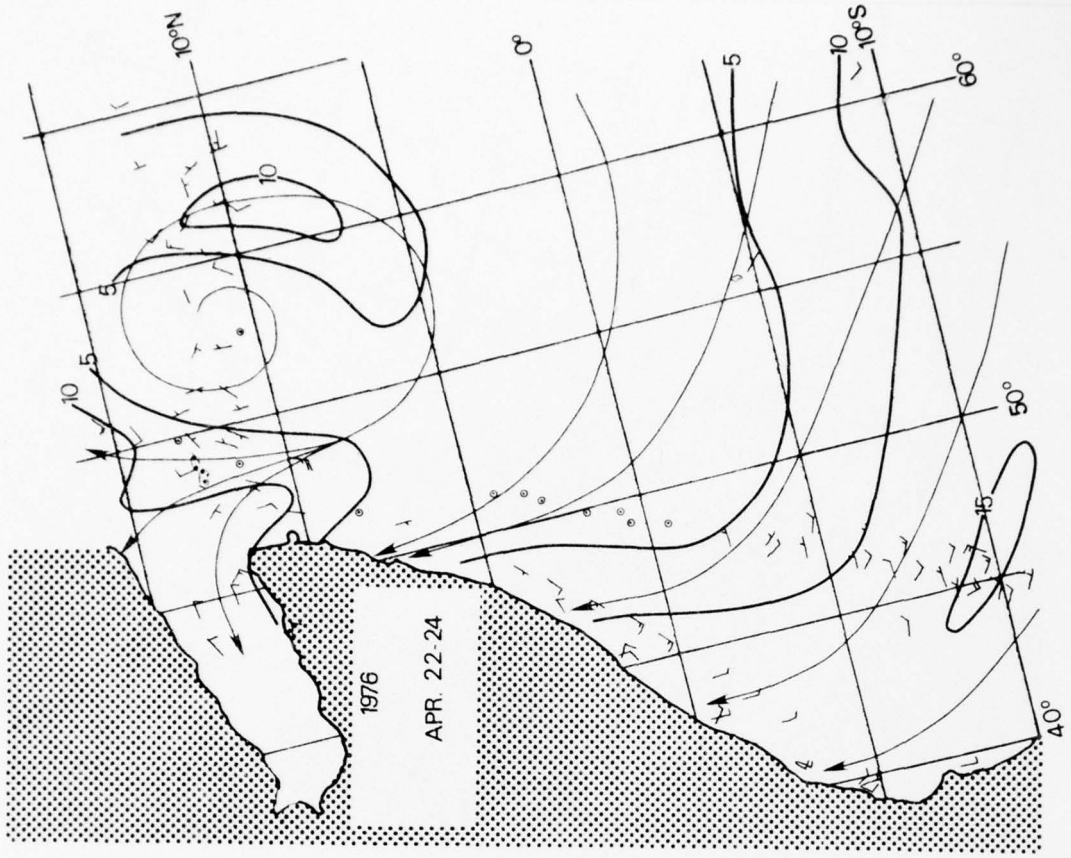

10°N
0°
10°S
60°
50°
40°
5
10
15
1976
APR. 1-3

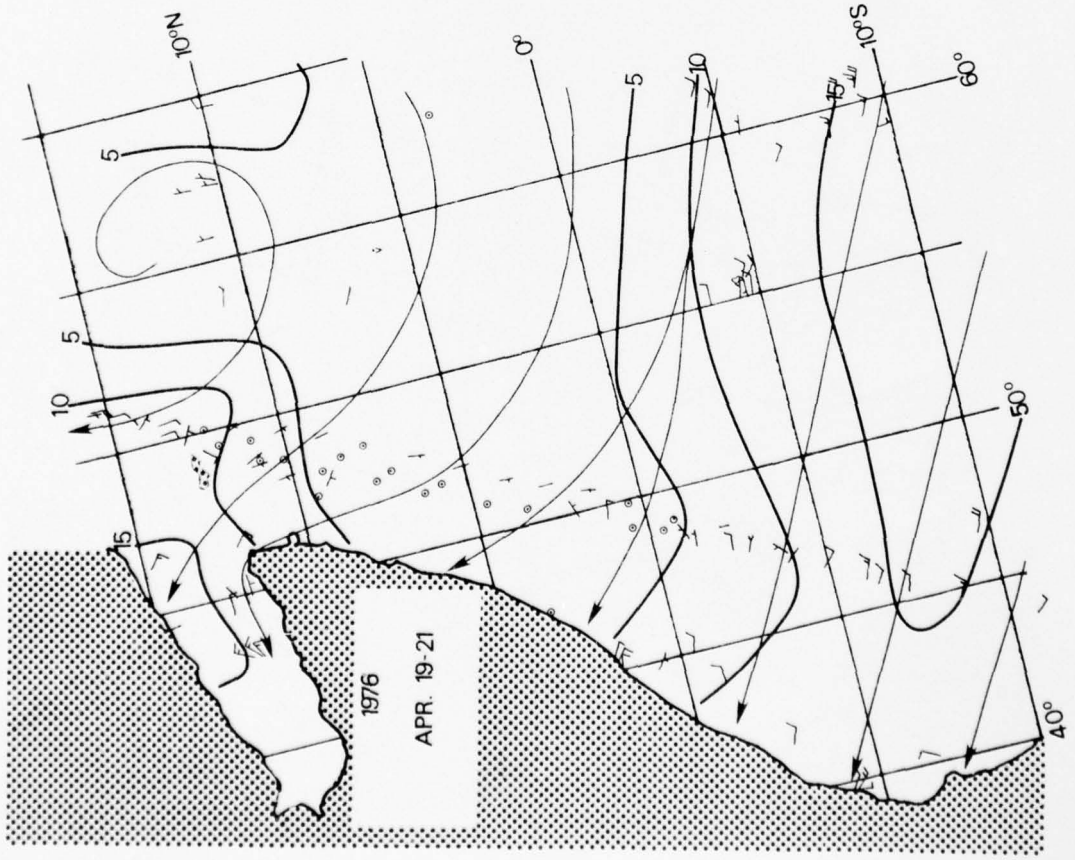

10°N
0°
10°S
60°
50°
40°
5
10
1976
APR. 10-12

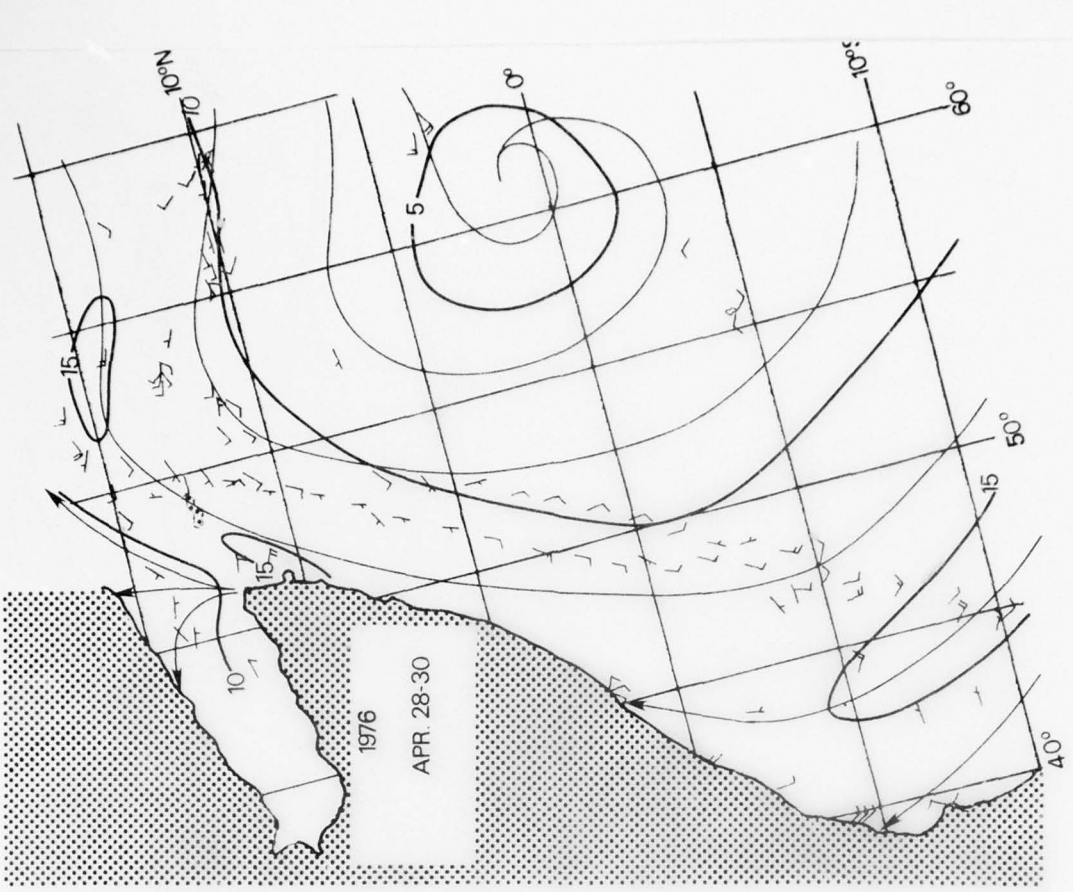

10°N
0°
10°S
60°
50°
40°
5
10
15
1976
APR. 7-9

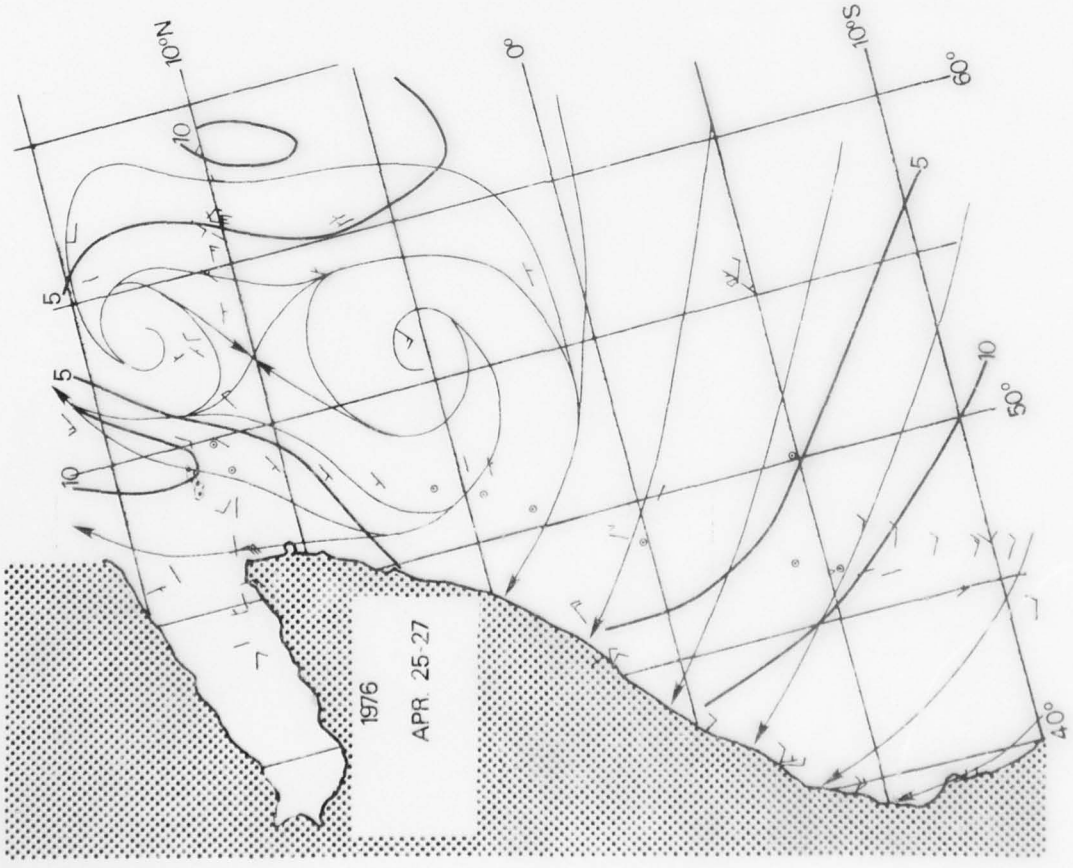

10°N
0°
10°S
60°
50°
40°
5
10
15
1976
APR 16-18

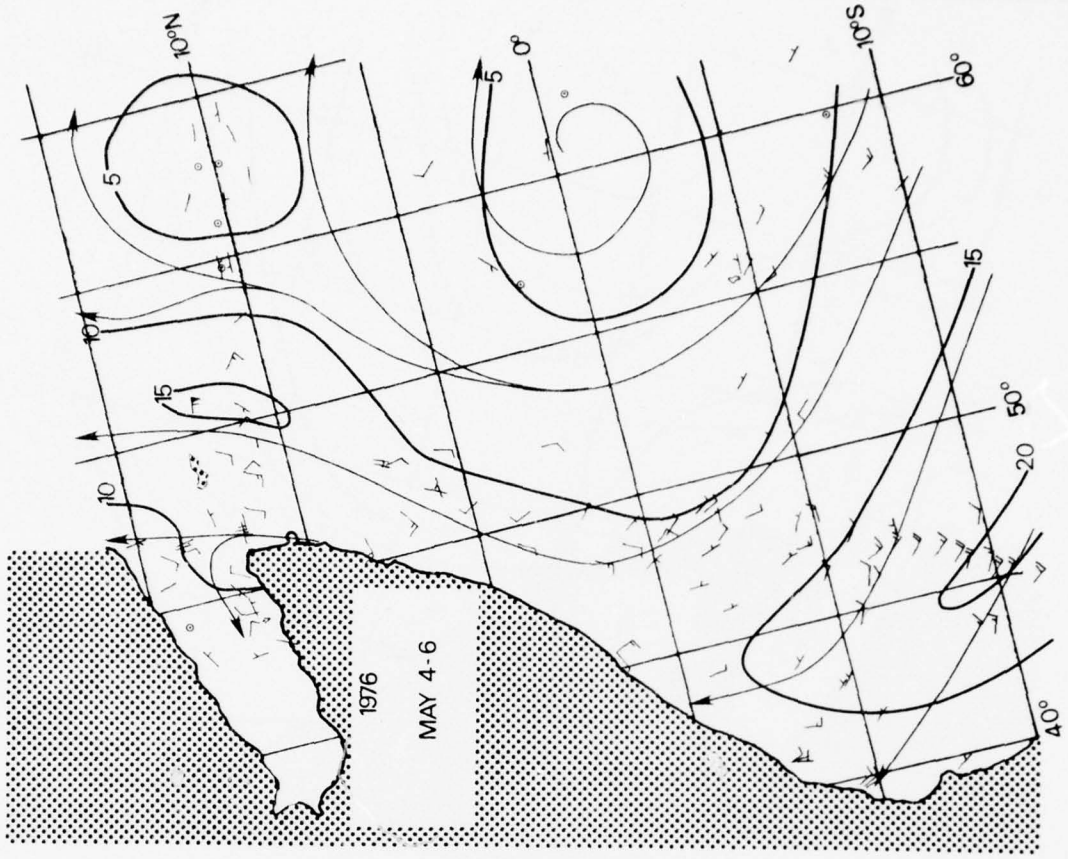

10°N
0°
10°S
60°
50°
40°
5
10
1976
APR. 13-15

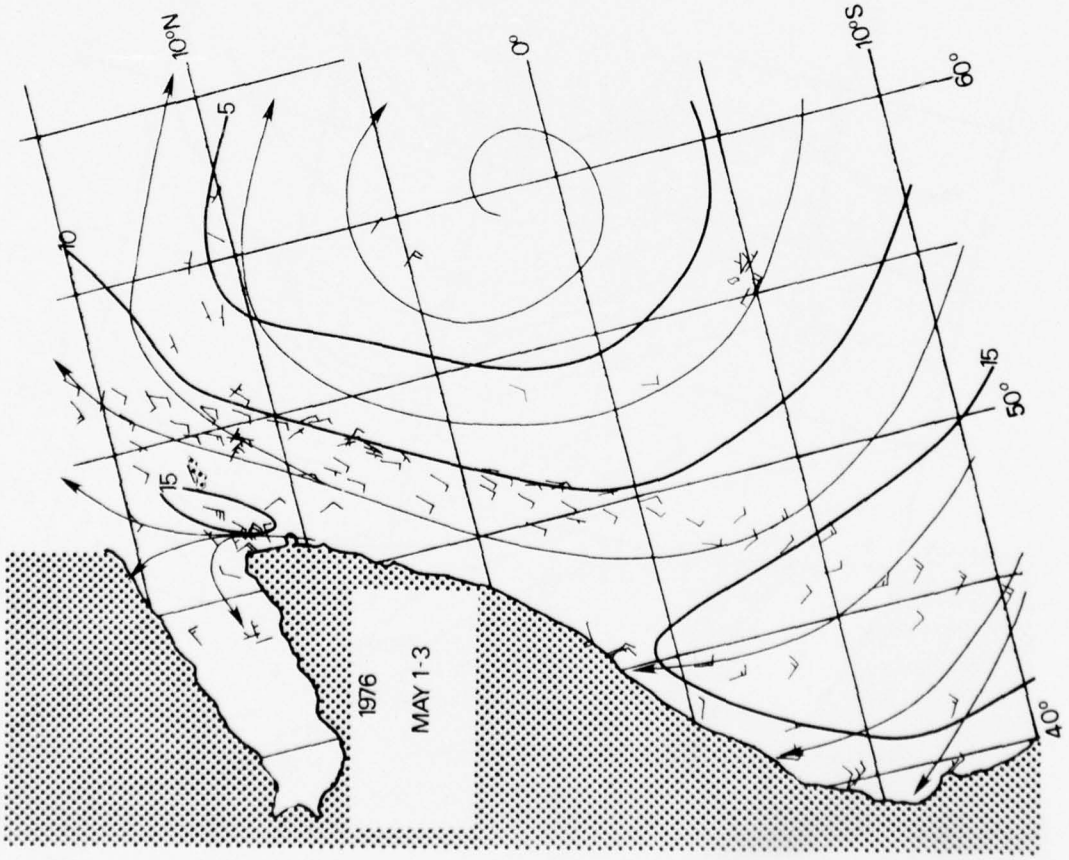

10°N
0°
10°S
60°
50°
40°
5
10
15
1976
APR. 22-24

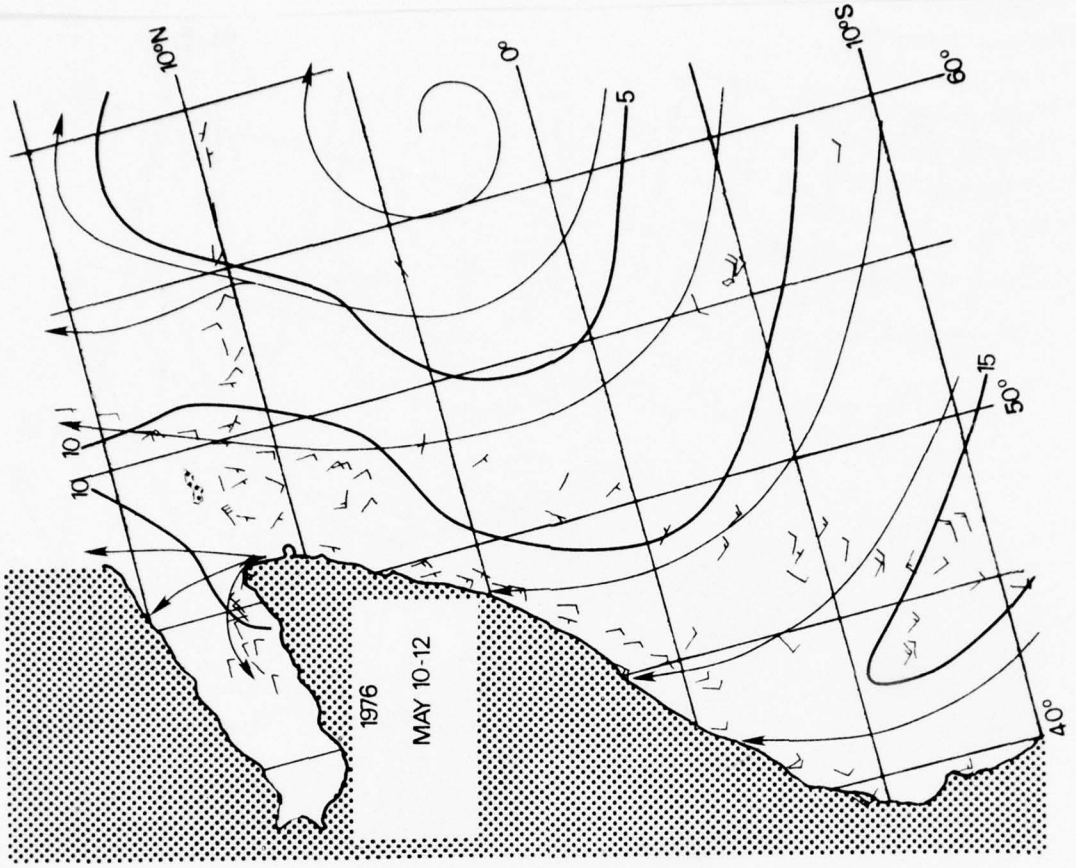

10°N
0°
10°S
60°
50°
40°
5
10
15
1976
APR. 19-21

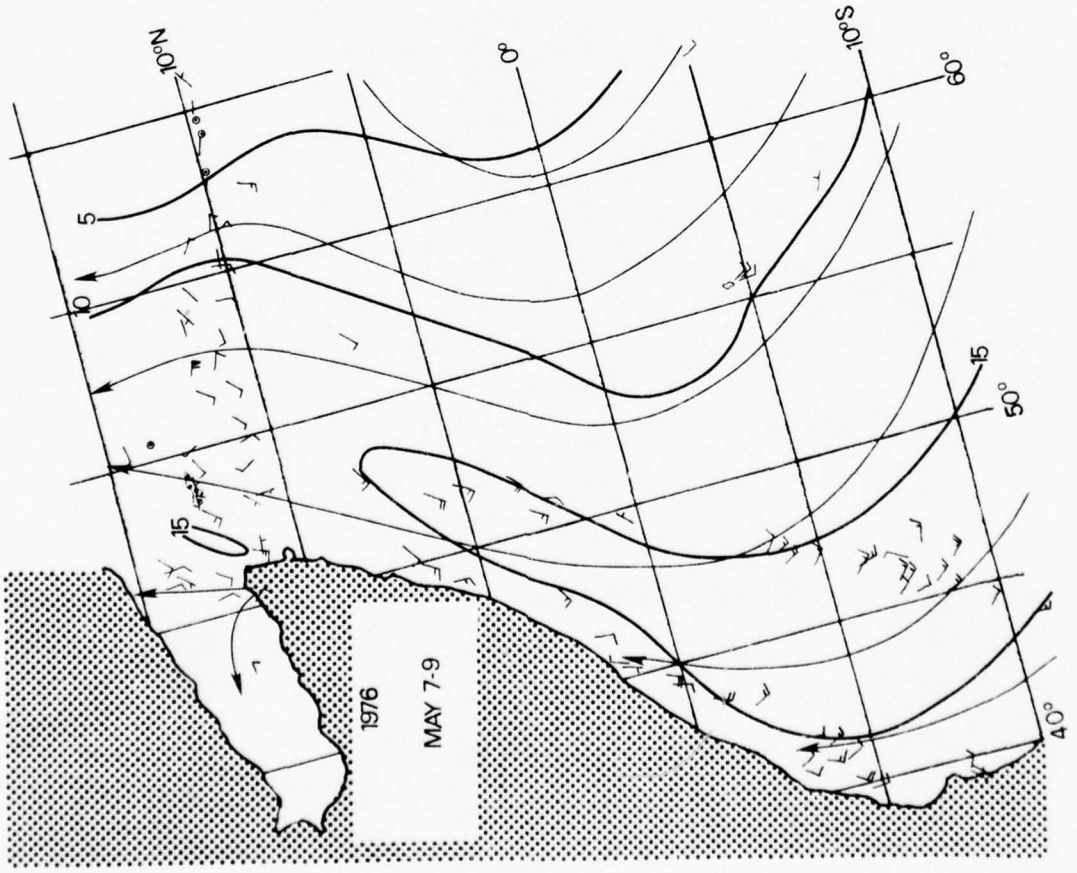

10°N
0°
10°S
60°
50°
40°
1976
APR. 28-30

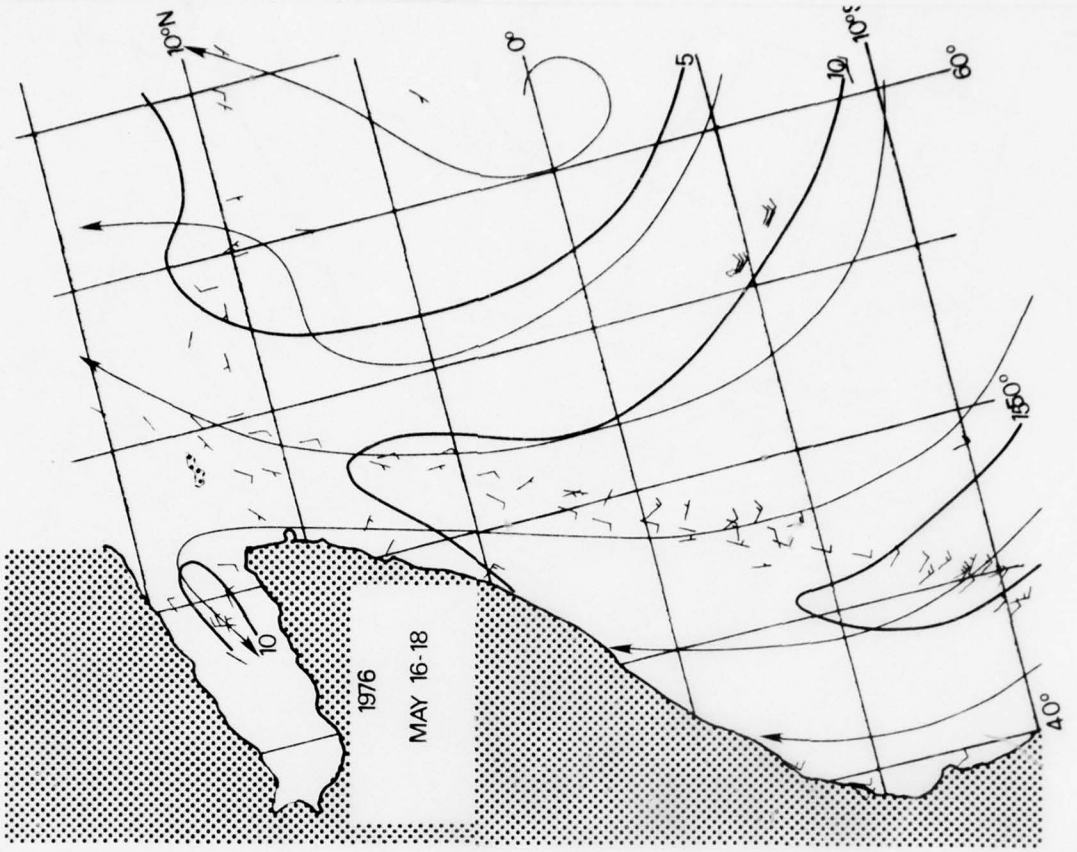

10°N
0°
10°S
60°
50°
40°
1976
APR. 25-27

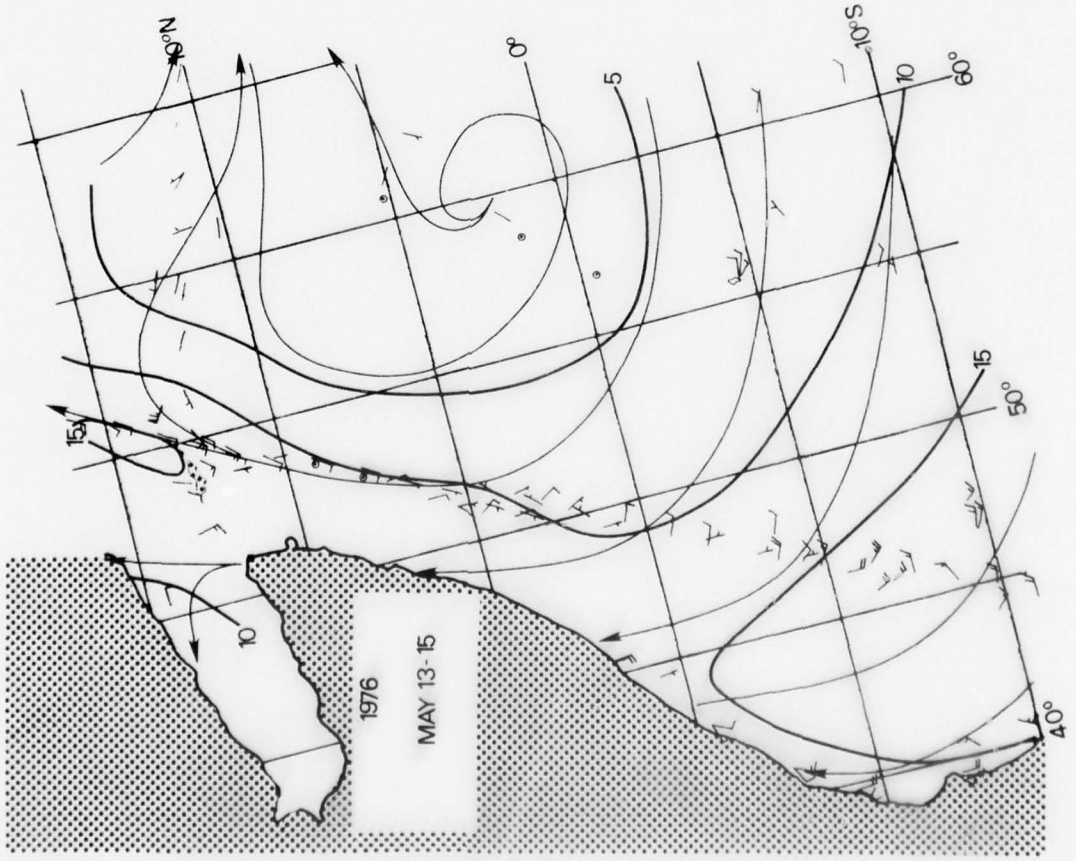

10°N
0°
10°S
60°
50°
40°
5
10
15
20
1976
MAY 4-6

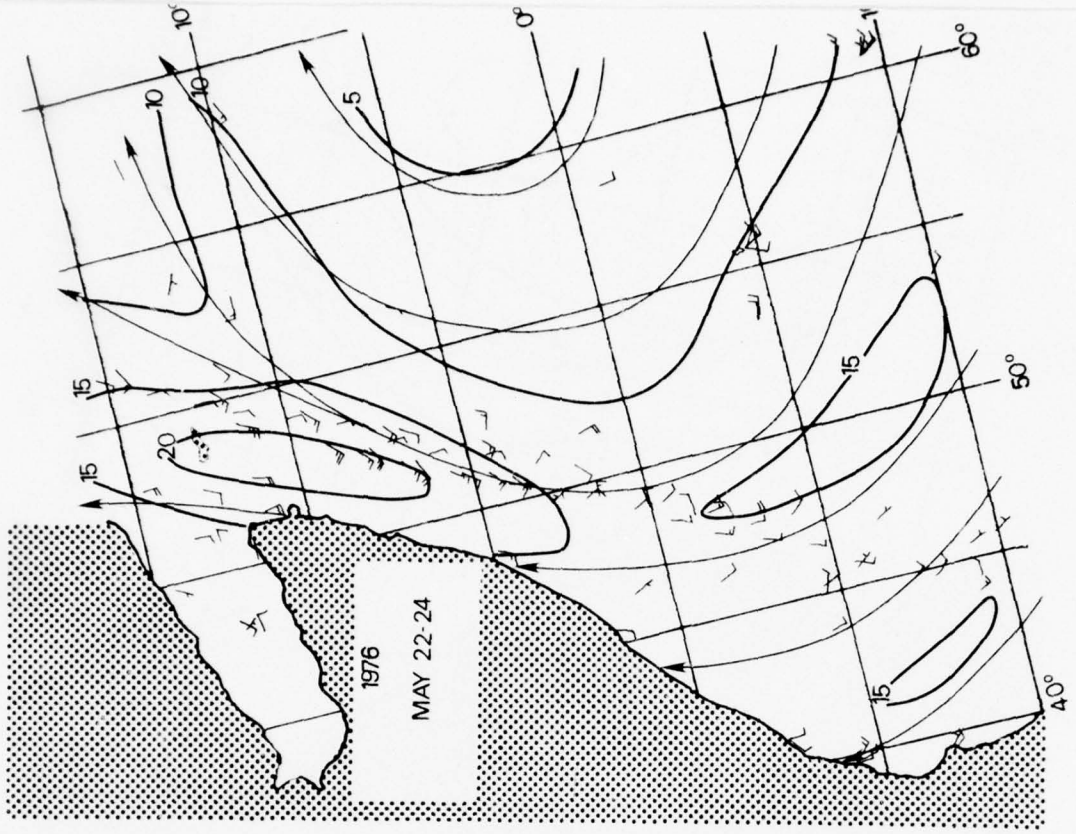

10°N
0°
10°S
60°
50°
40°
5
10
15
1976
MAY 1-3

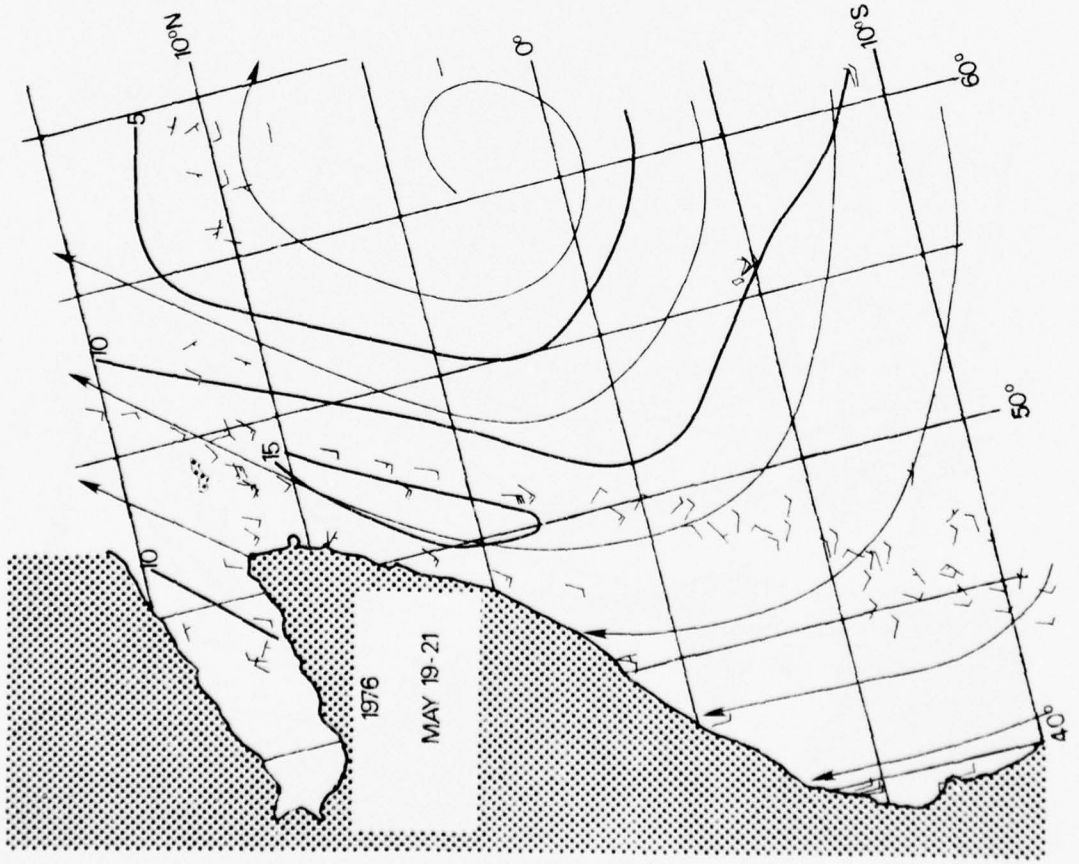

10°N
0°
10°S
60°
50°
40°
5
10
15
1976
MAY 10-12

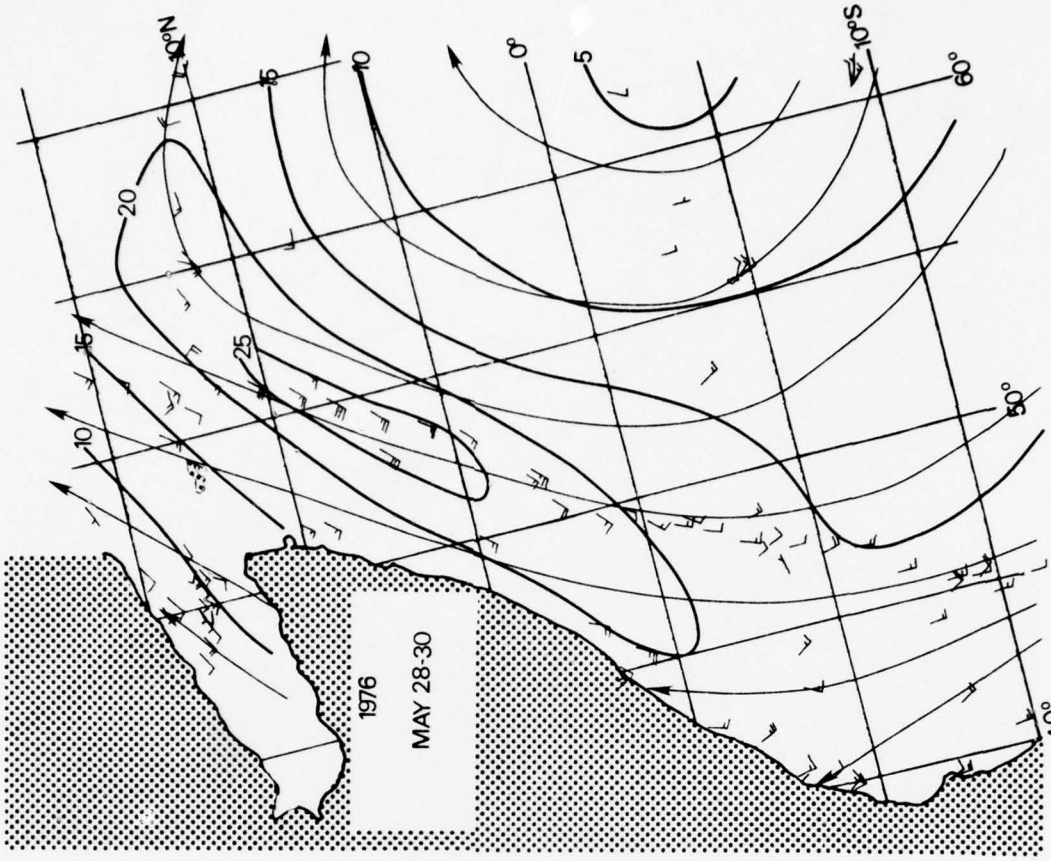

10°N
0°
10°S
60°
50°
40°
5
10
15
1976
MAY 7-9

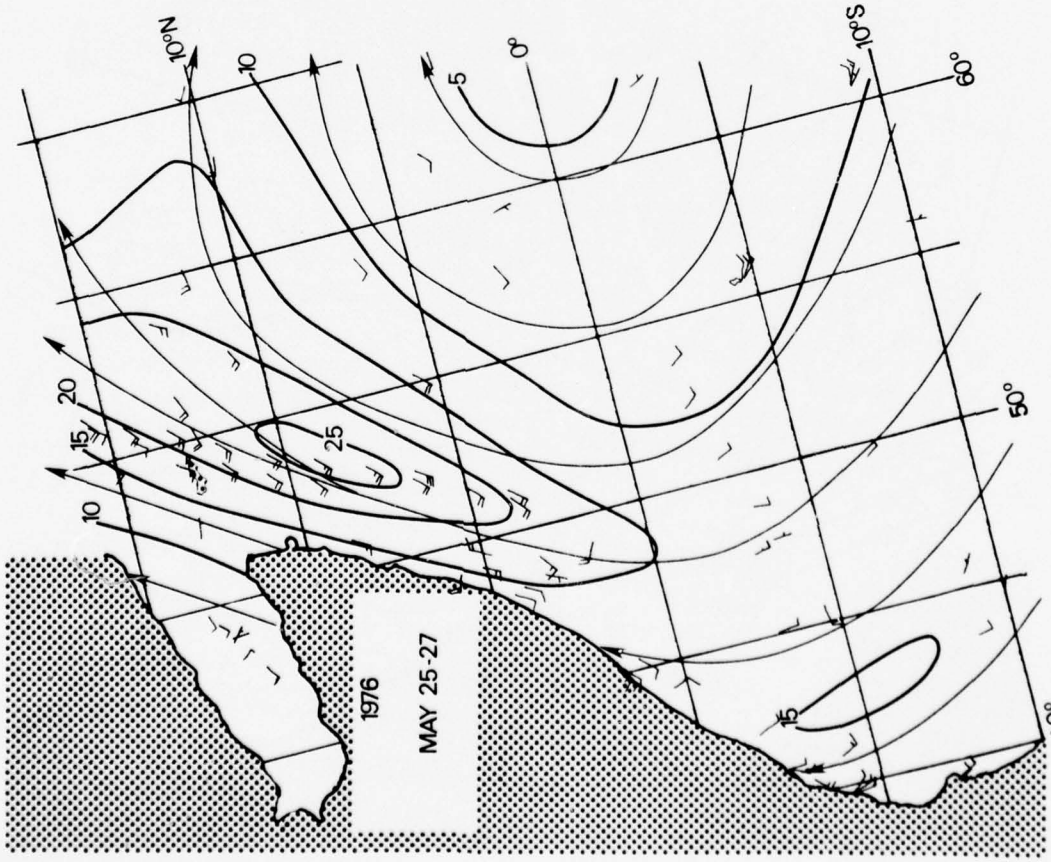

10°N
0°
5
10
10°S
60°
150°
40°
10
1976
MAY 16-18

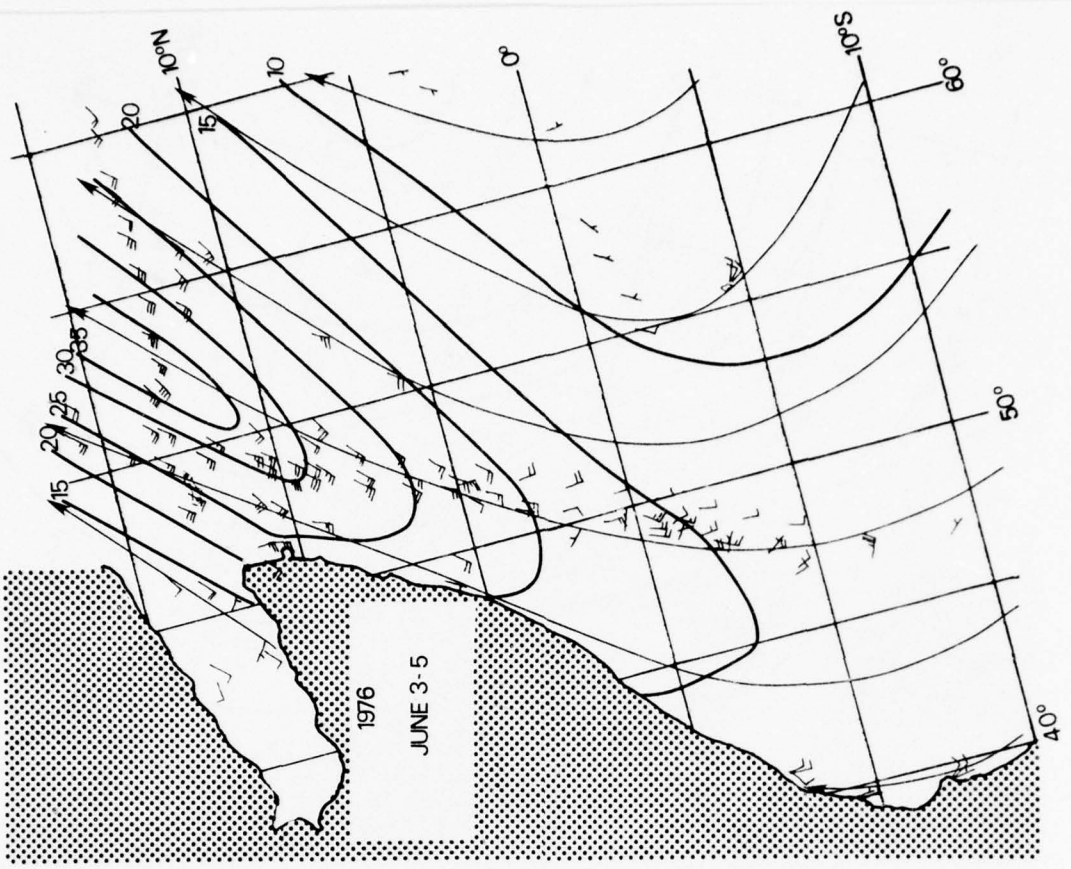

10°N
0°
5
10°S
10
60°
15
50°
40°
10
1976
MAY 13-15

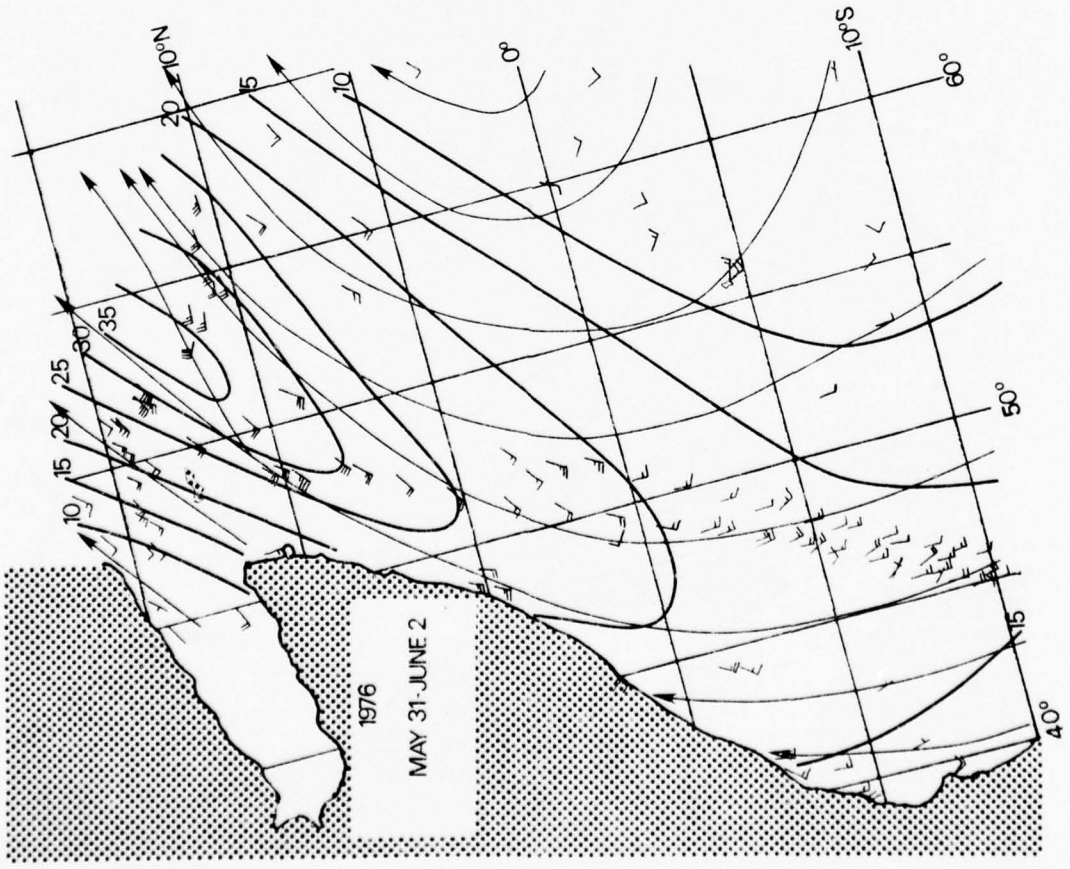

10°
10
10
0°
5
60°
15
20
15
50°
15
15
1976
MAY 22-24
40°

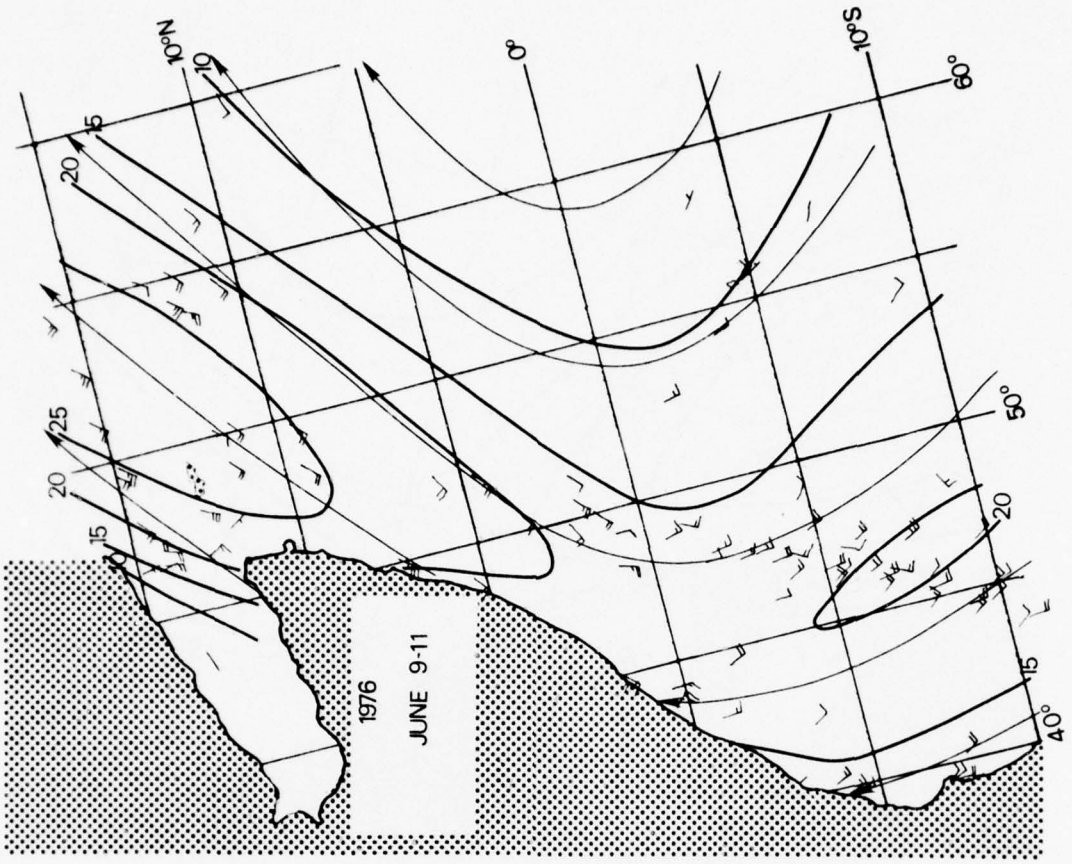

10°N
0°
10°S
5
60°
10
15
50°
10
1976
MAY 19-21
40°

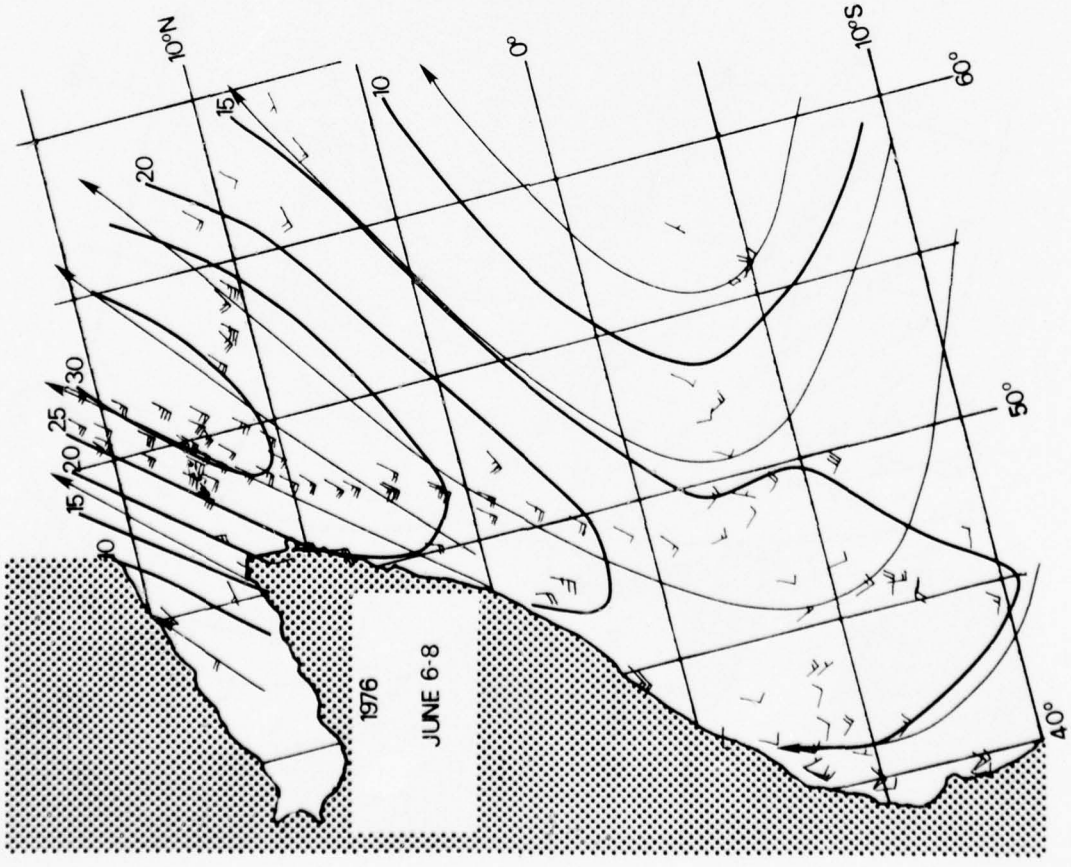

10°N
10°S
0°
5
10
15
20
25
60°
50°
40°
1976
MAY 28-30

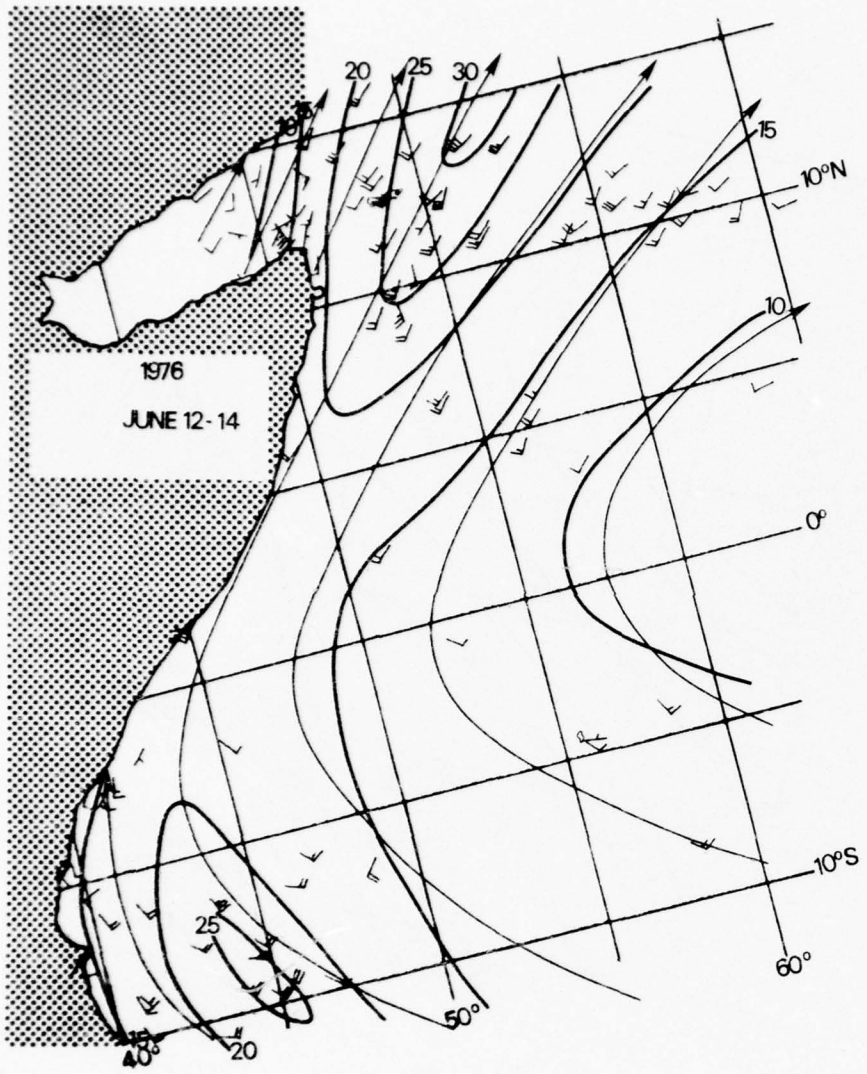

10°N
10°S
0°
5
10
15
20
25
60°
50°
40°
1976
MAY 25-27

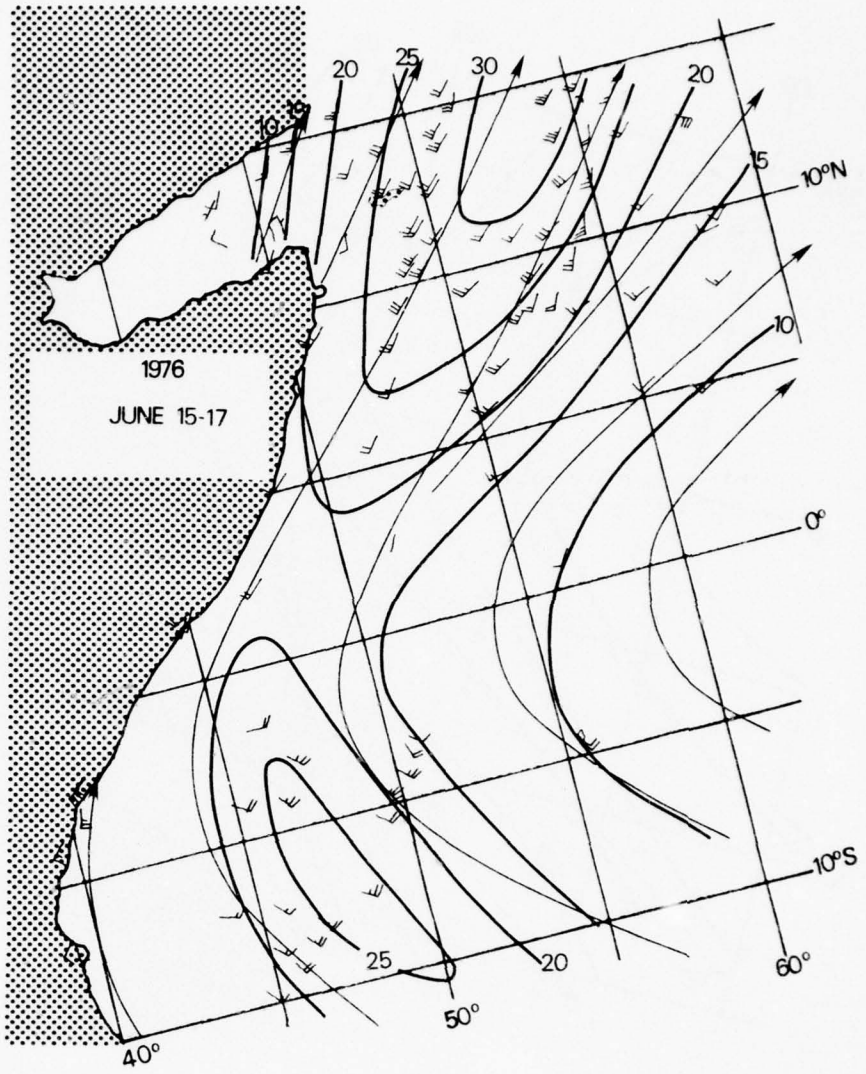

10°N
0°
10°S
60°
50°
40°
10
15
20
25
30
35
1976
JUNE 3-5

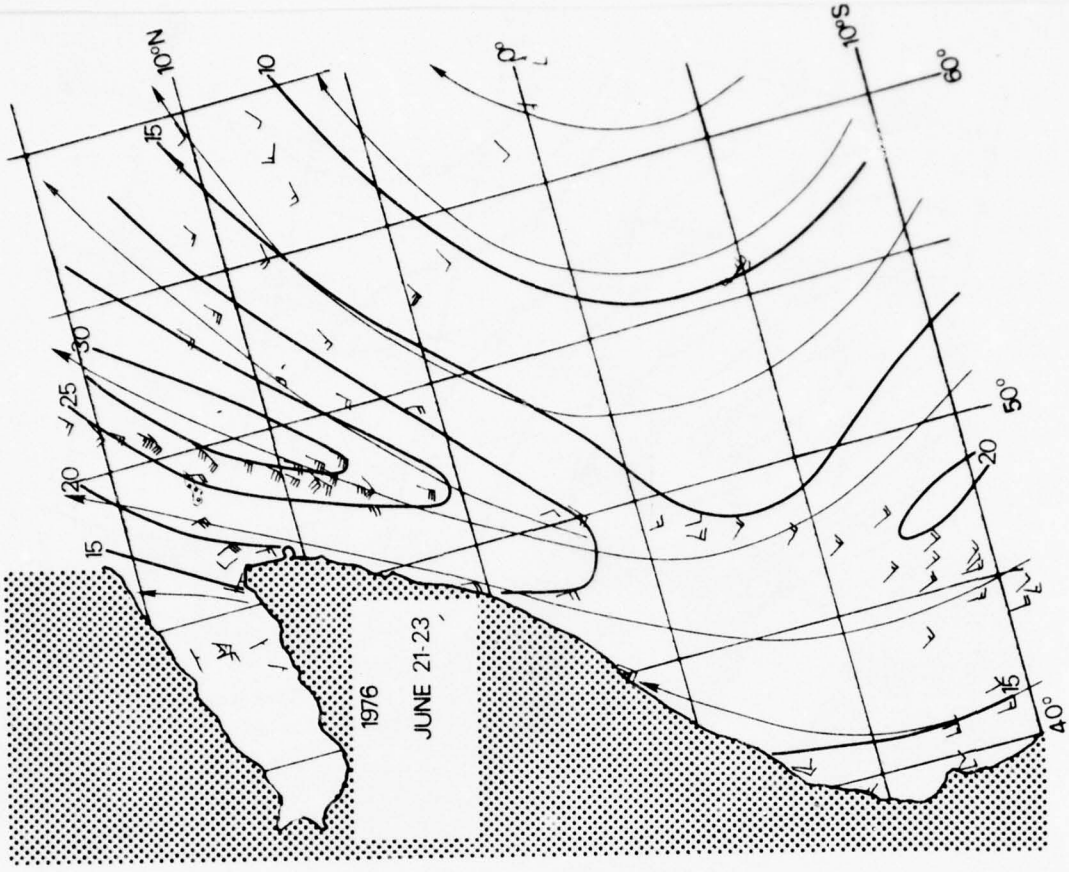

10°N
0°
10°S
60°
50°
40°
10
15
20
25
30
35
1976
MAY 31-JUNE 2

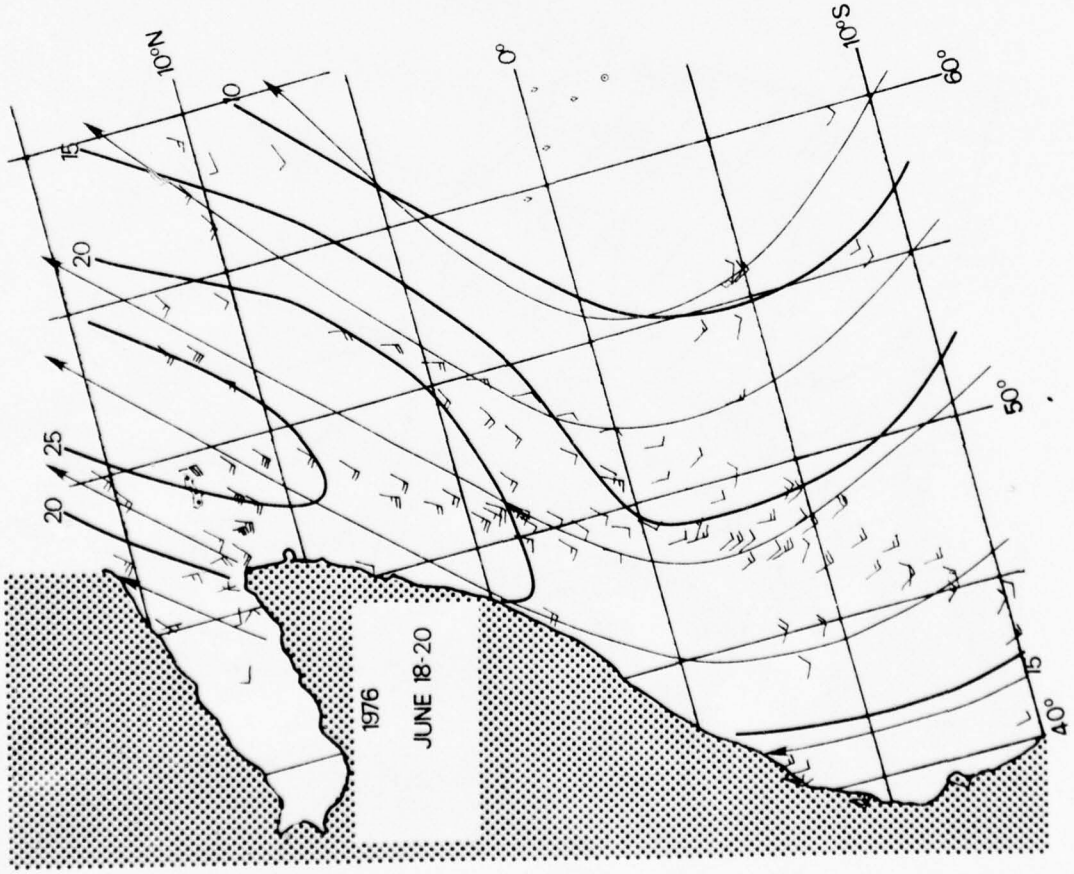

10°N
0°
10°S
60°
50°
40°
10
15
20
25
30
1976
JUNE 9-11

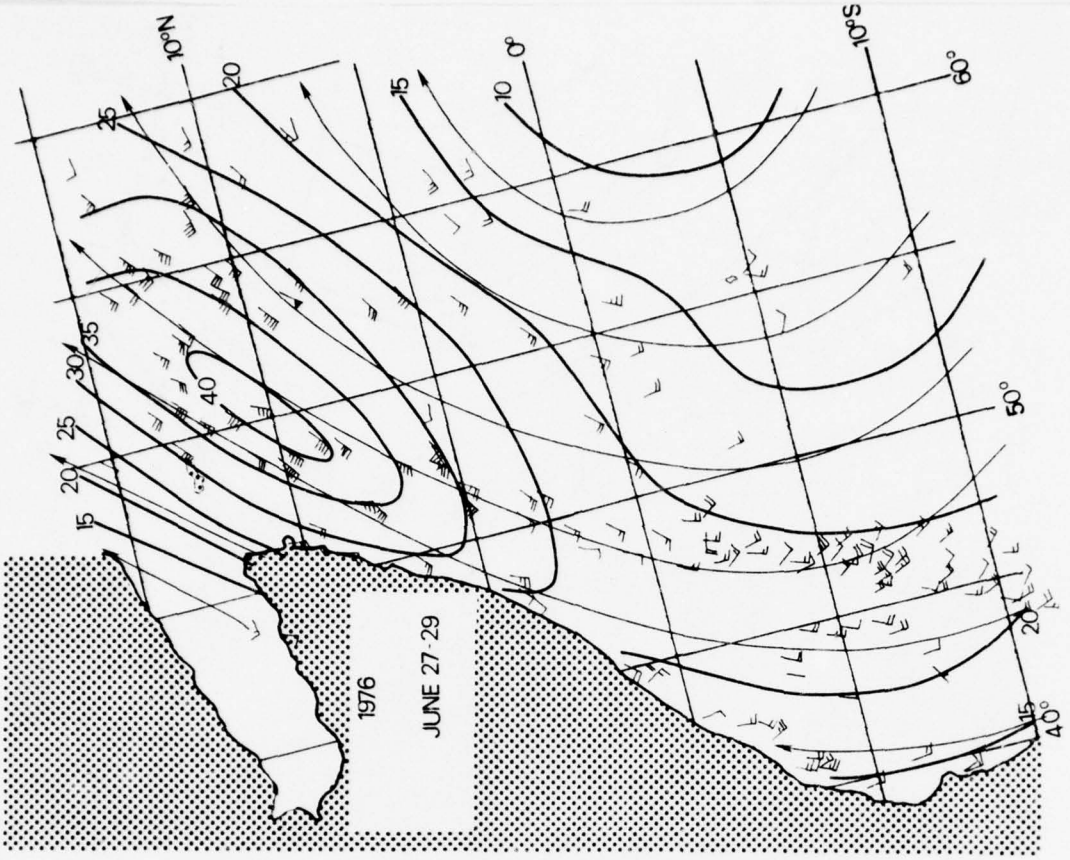

10°N
0°
10°S
60°
50°
40°
10
15
20
25
30
1976
JUNE 6-8

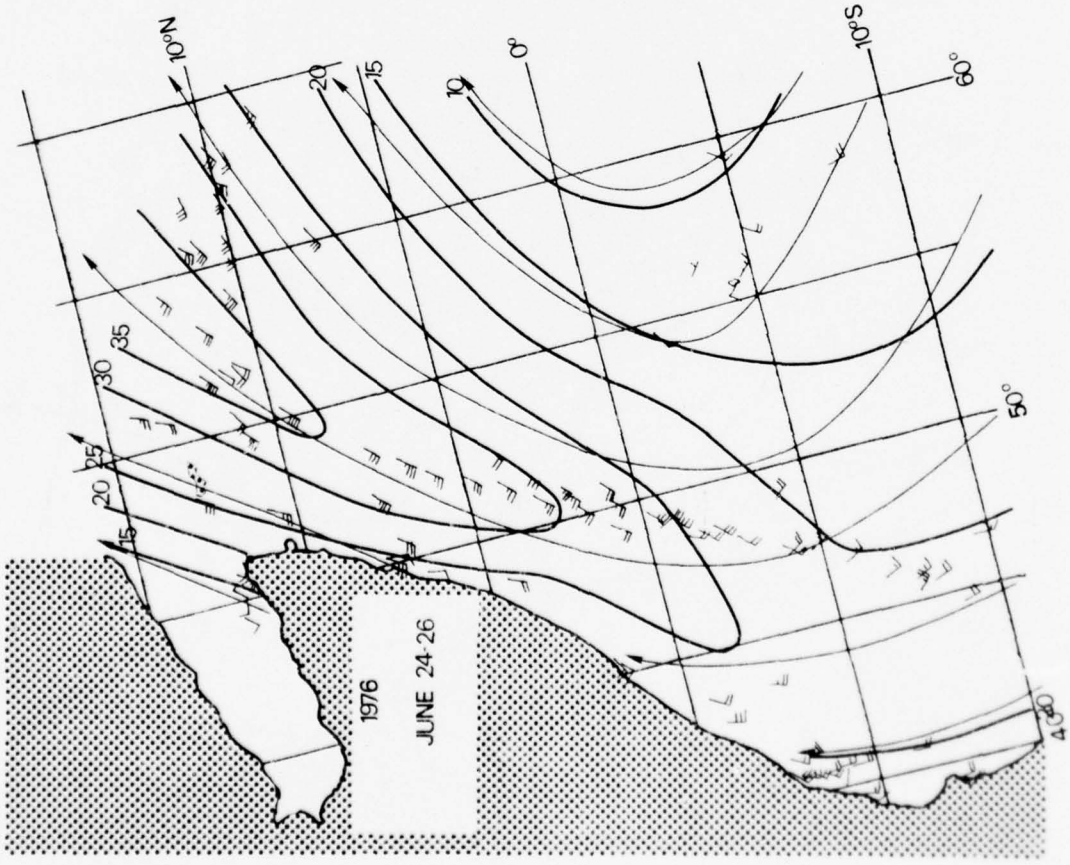

1976
JUNE 12-14
20
25
30
15
10°N
10
0°
10°S
60°
50°
40°
25
20

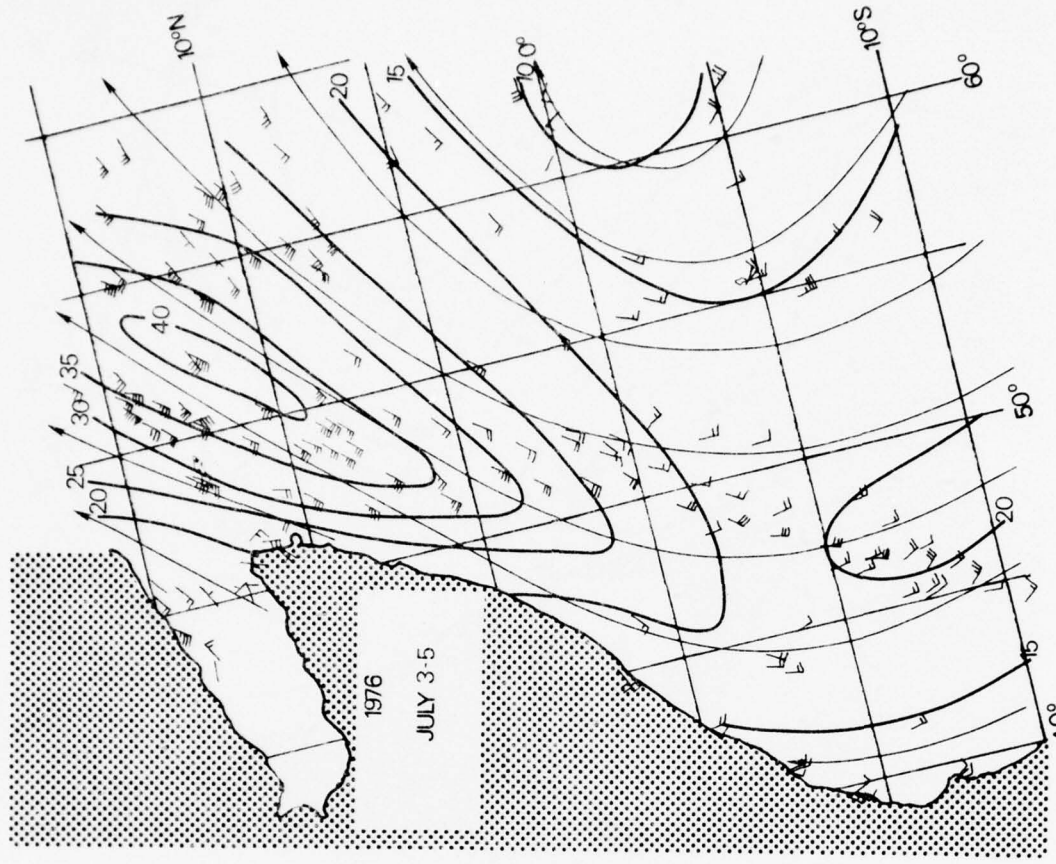

1976
JUNE 15-17
20
25
30
20
15
10°N
10
0°
10°S
60°
50°
40°
25
20

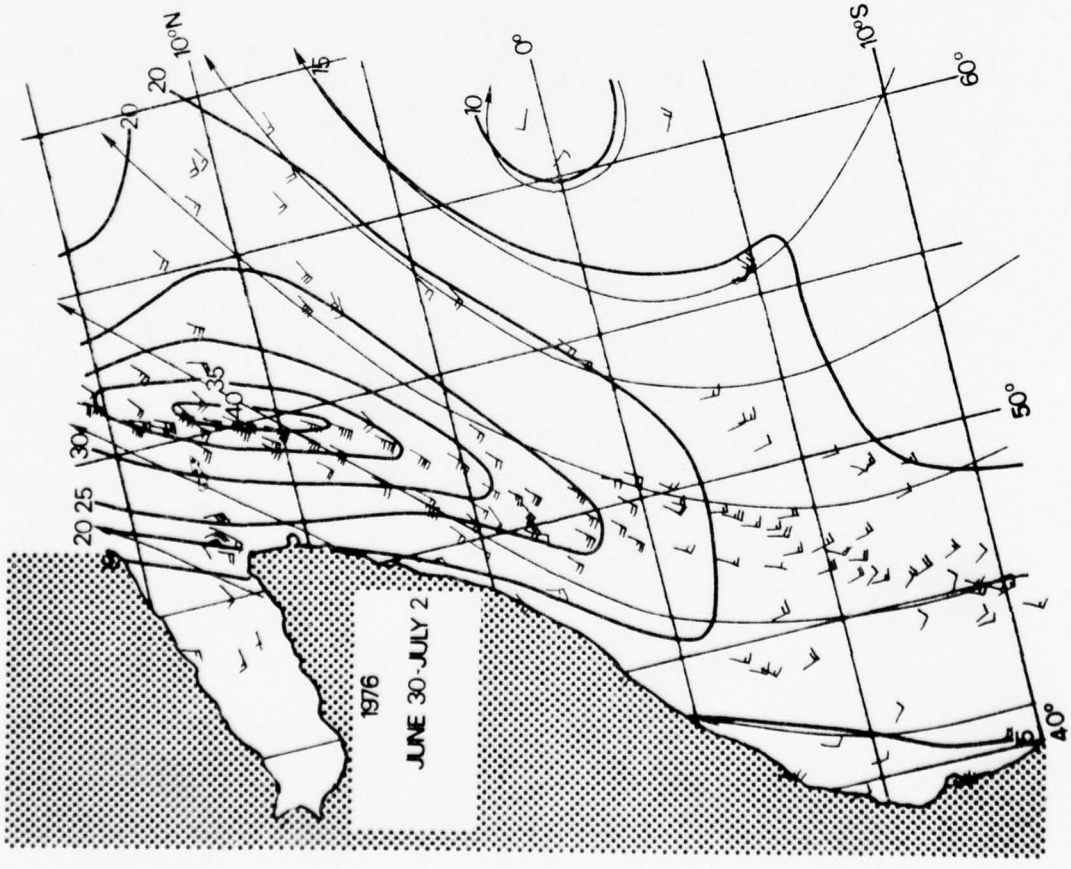

10°N
0°
10°S
60°
50°
40°
10
15
20
25
30
1976
JUNE 21-23

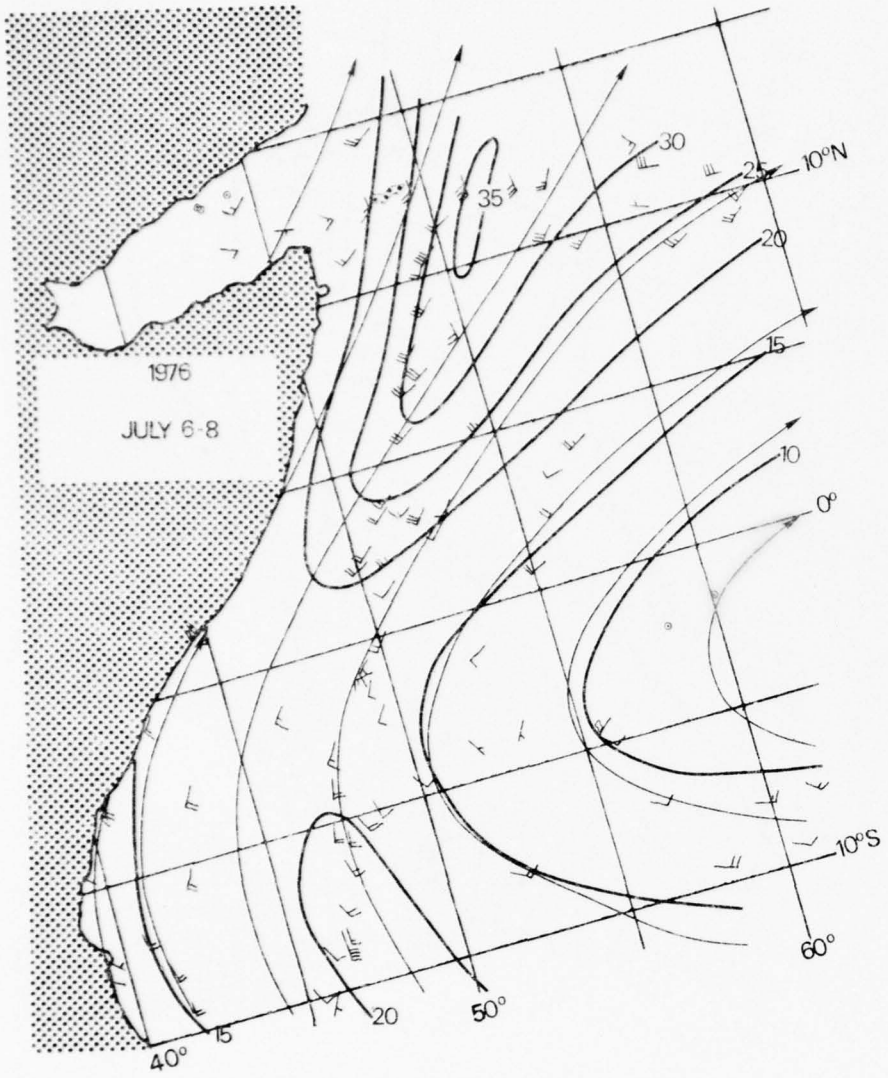

10°N
0°
10°S
60°
50°
40°
10
15
20
25
1976
JUNE 18-20

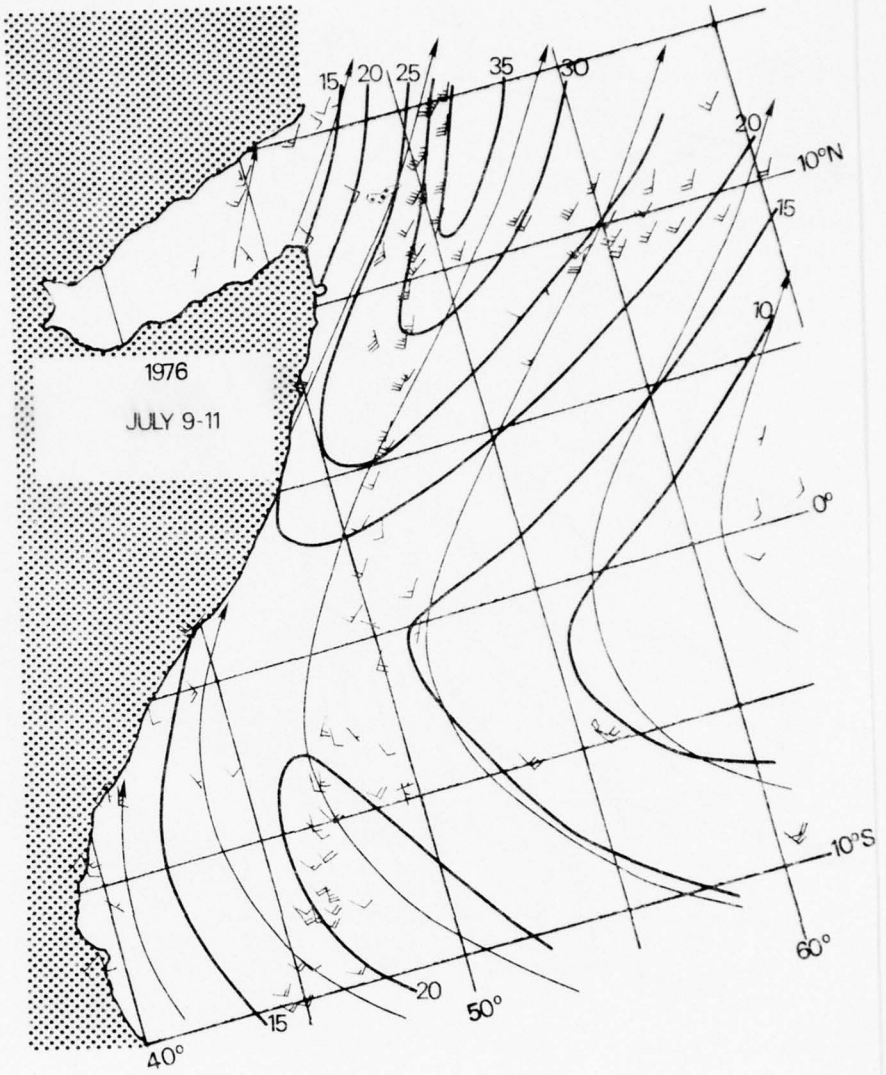

10°N
0°
10°S
60°
50°
40°
JUNE 27-29
1976

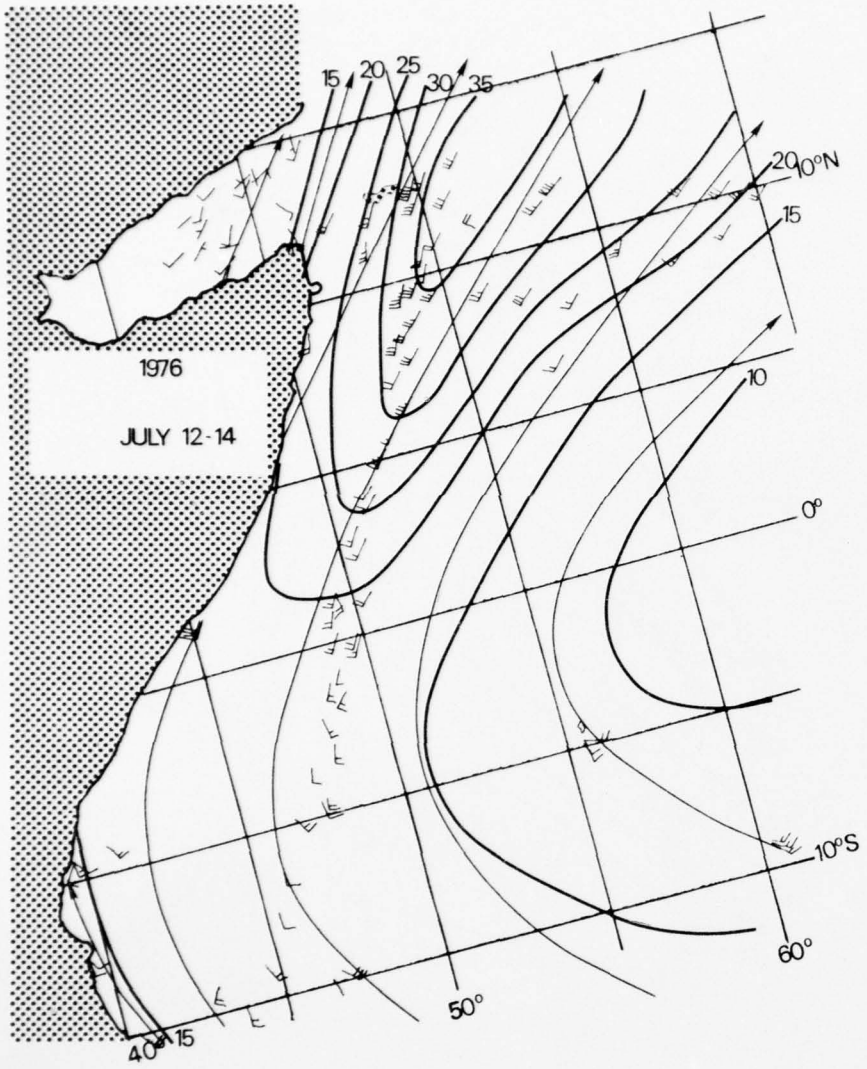

10°N
0°
10°S
60°
50°
40°
JUNE 24-26
1976

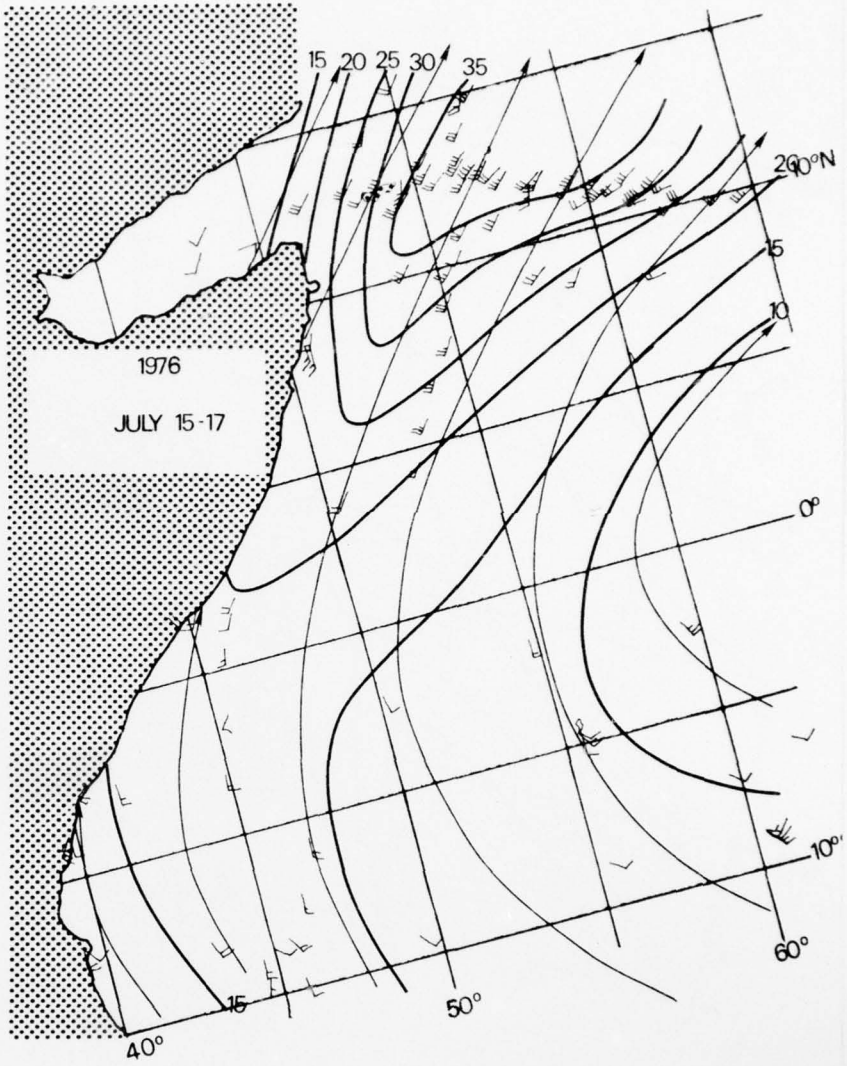

JULY 3-5
1976
10°N
10°S
0°
60°
50°
40°
20
15
25
30
35
40

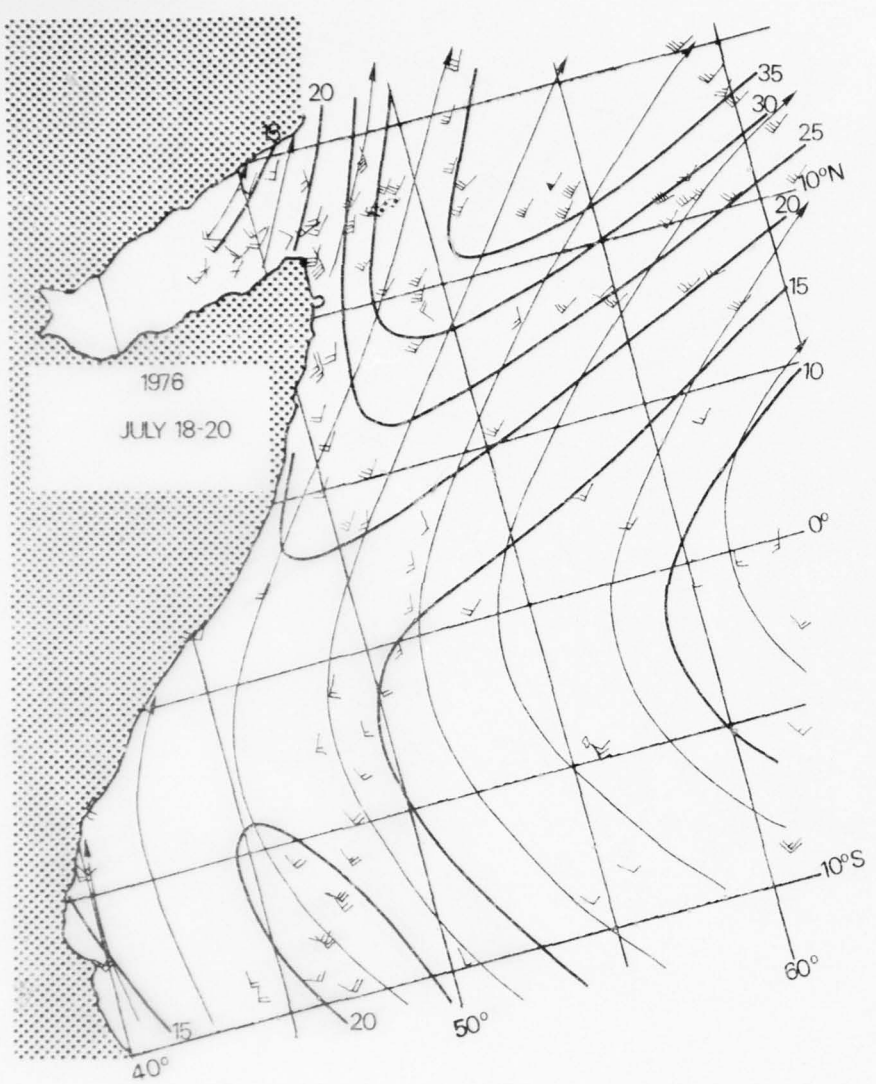

JUNE 30-JULY 2
1976
10°N
10°S
0°
60°
50°
40°
10
15
20
25
30
35
40

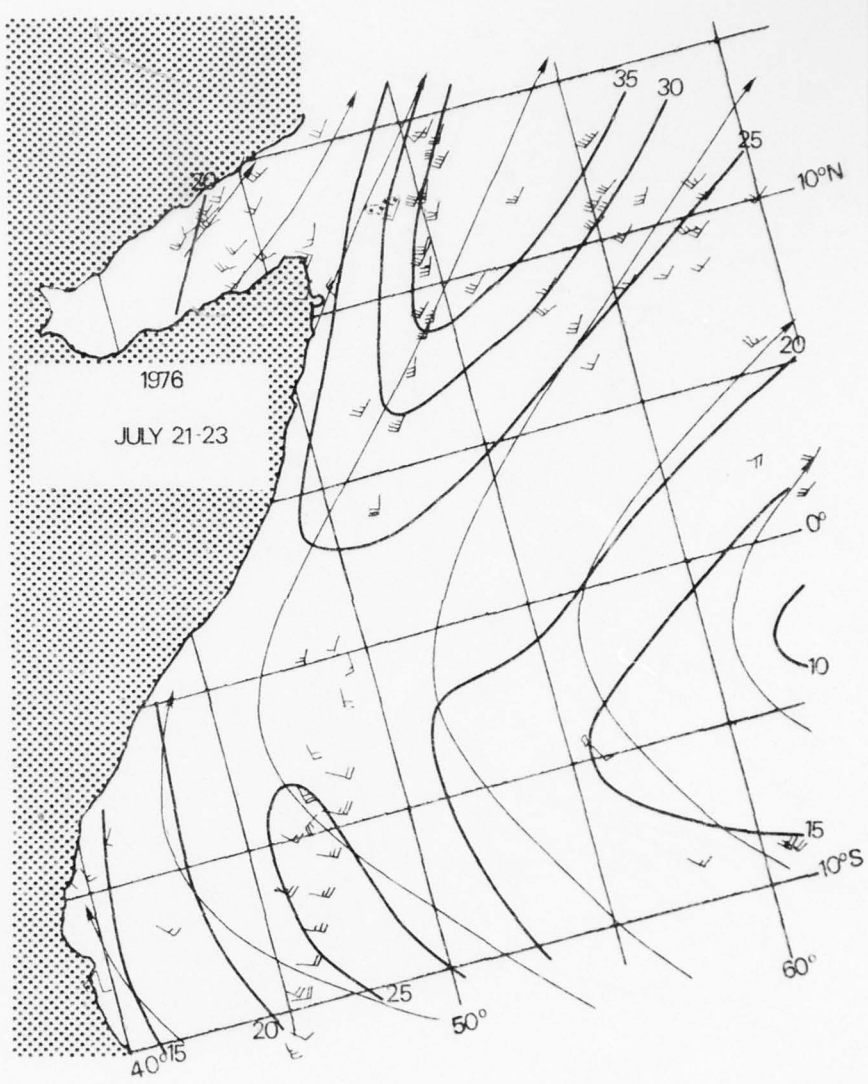

1976
JULY 6-8
35
30
25
20
15
10
0°
10°N
10°S
60°
50°
40°
15
20

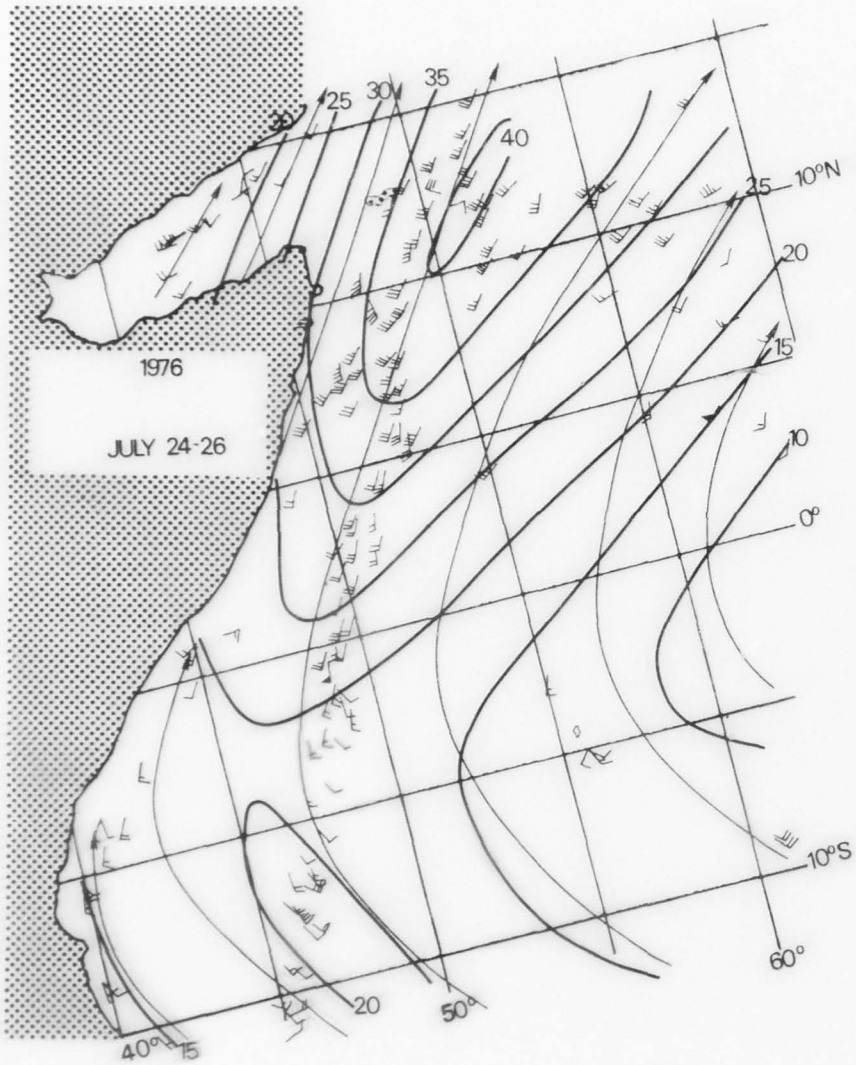

1976
JULY 9-11
15
20
25
35
30
20
10°N
15
10
0°
10°S
60°
50°
40°
15
20

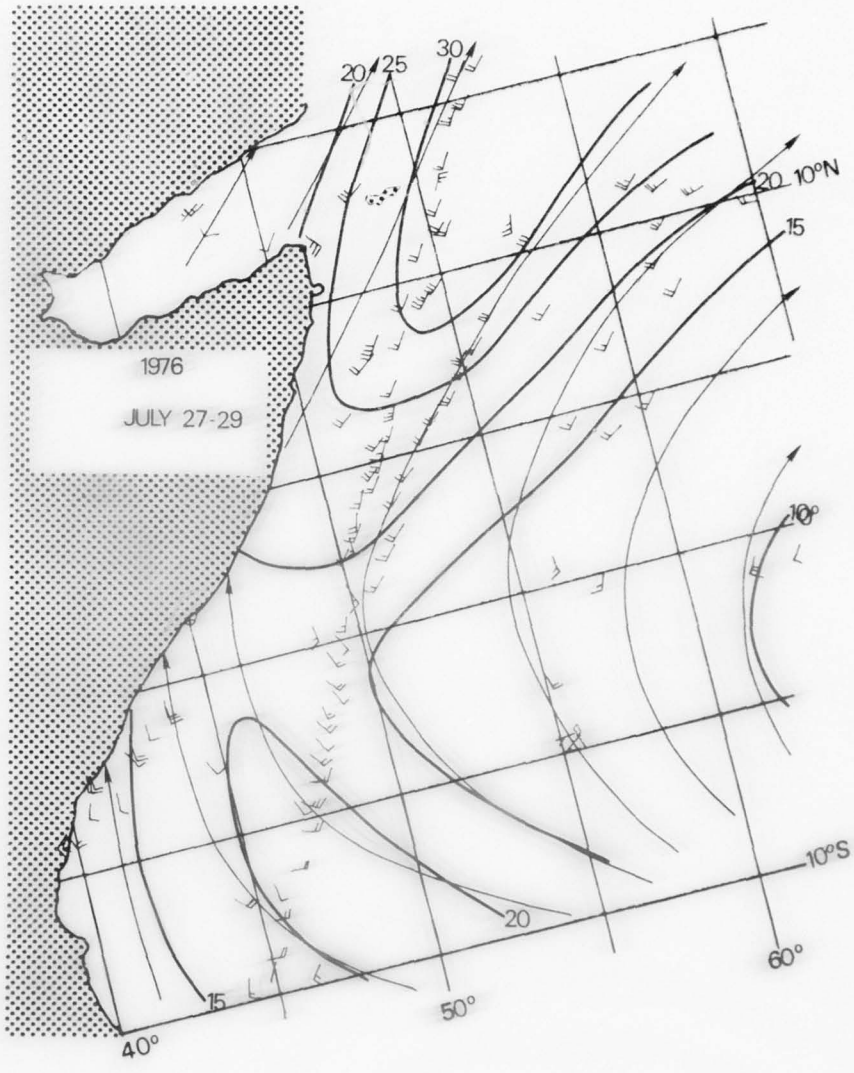

15
20
25
30
35
20
10°N
15
10
1976
JULY 12-14
0°
10°S
60°
50°
40°
15

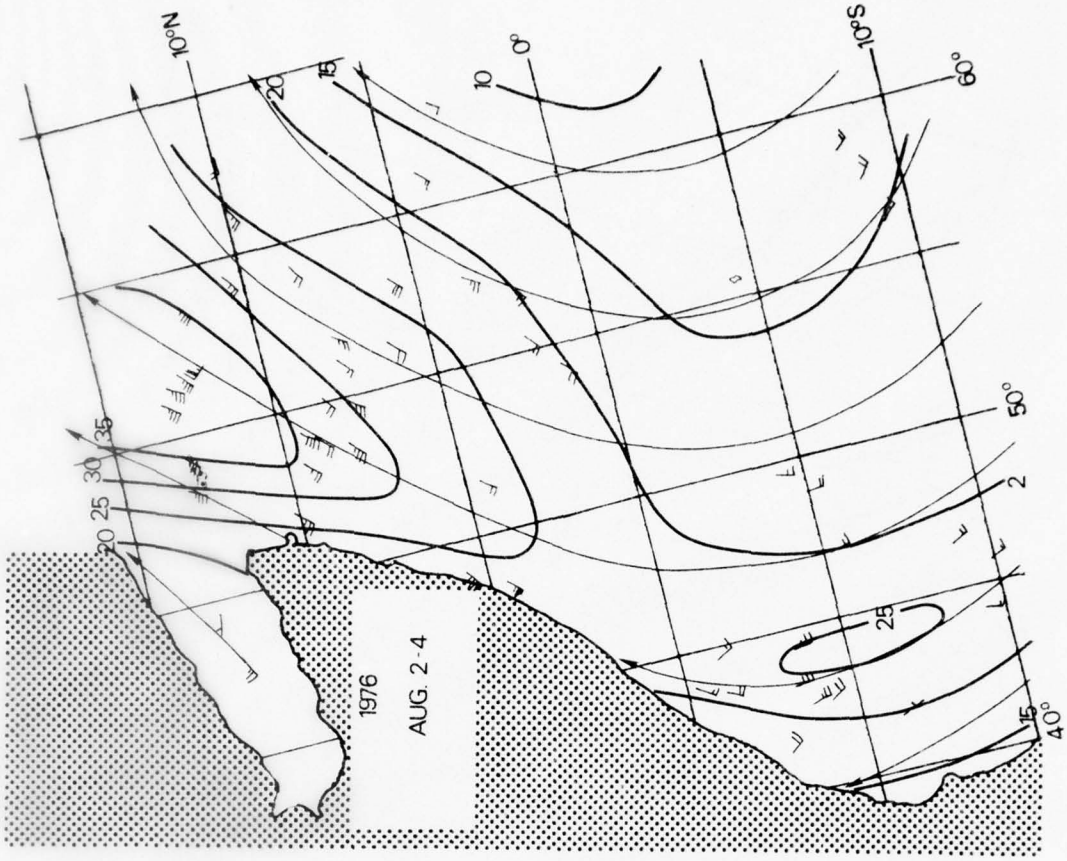

15
20
25
30
35
20
10°N
15
10
1976
JULY 15-17
0°
10°
60°
50°
40°
15

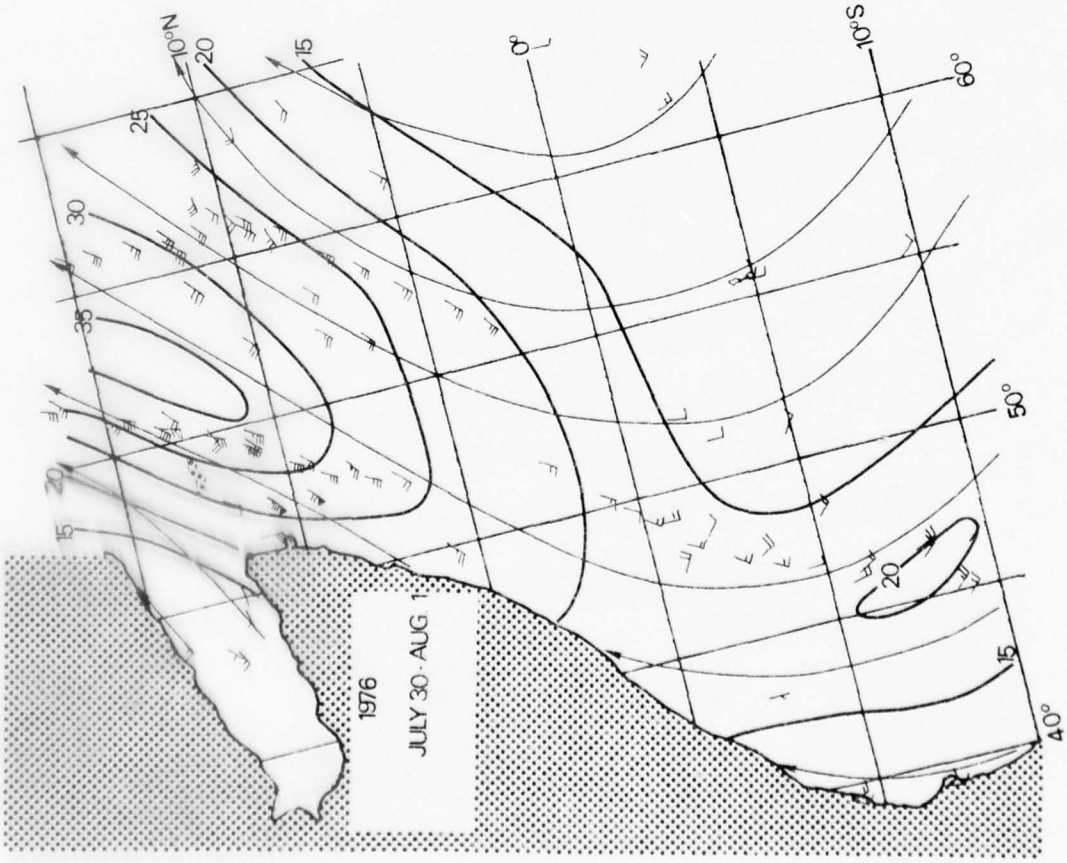

1976
JULY 18-20
35
30
25
20
15
10
10°N
0°
10°S
60°
50°
40°
15
20

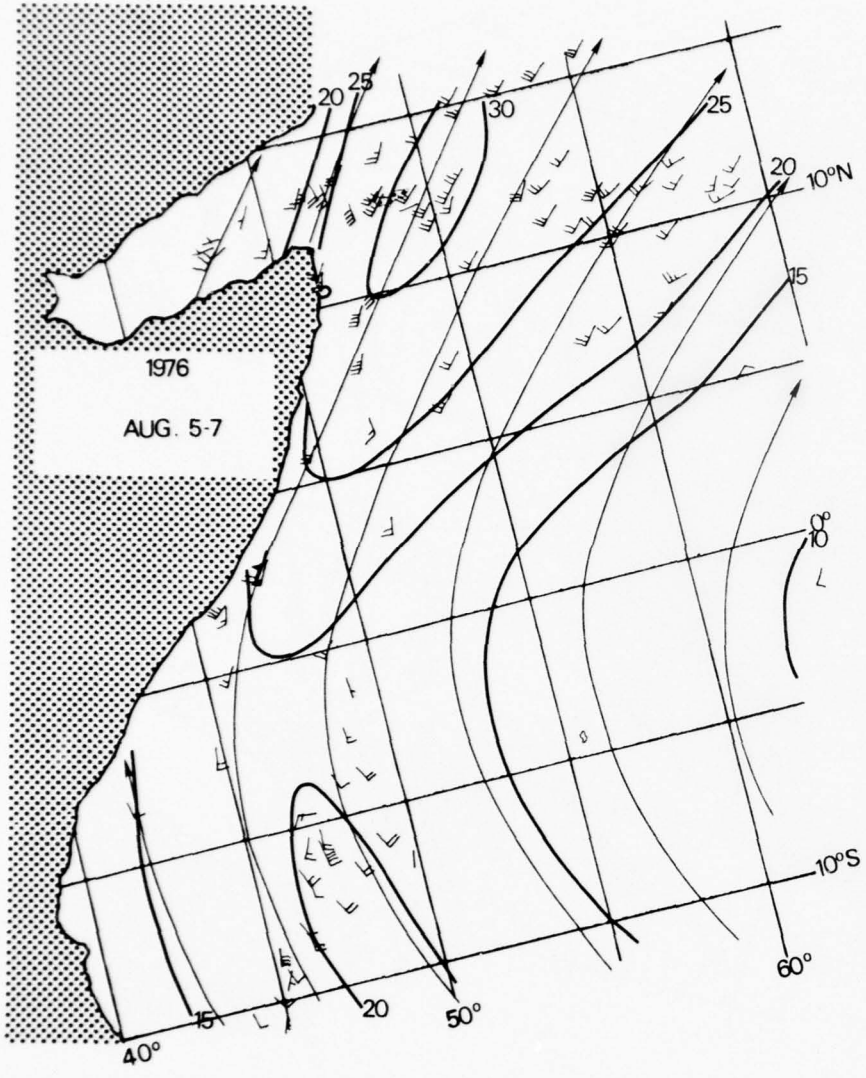

1976
JULY 21-23
35
30
25
20
15
10
10°N
0°
10°S
60°
50°
40°
15
20
25

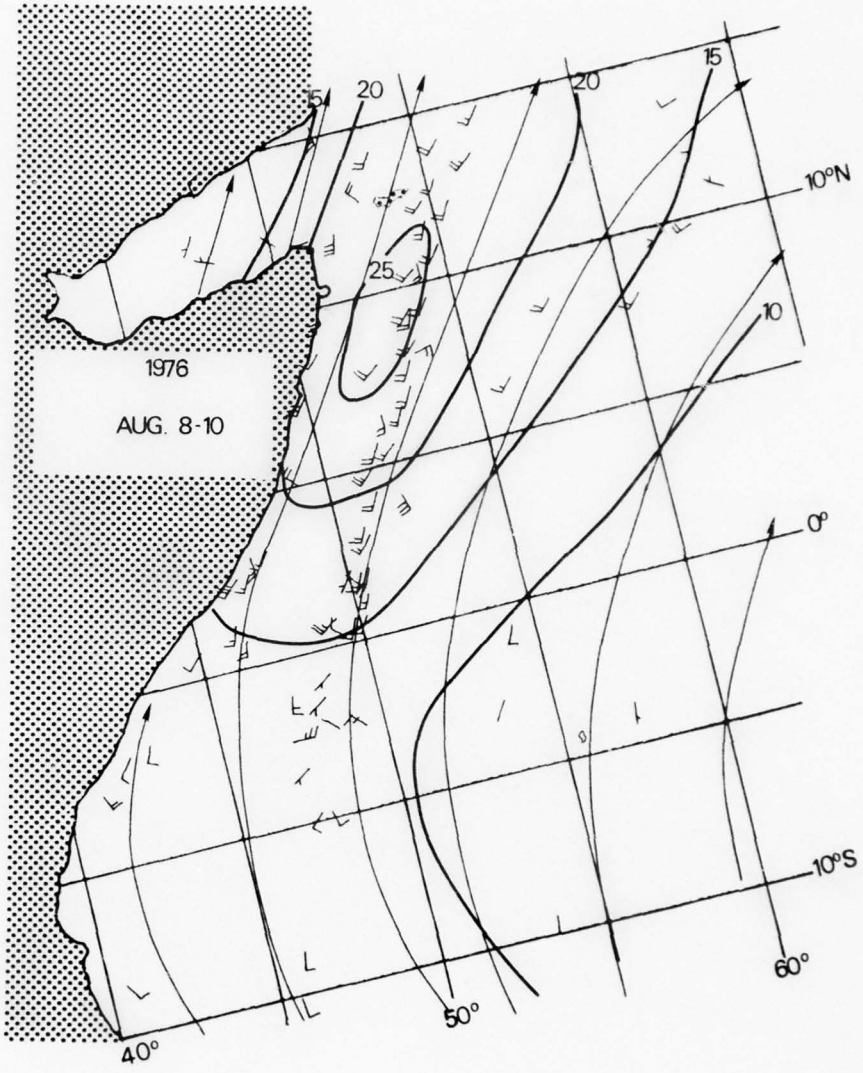

1976
JULY 24-26
25
30
35
40
25
20
15
10
0°
10°N
10°S
60°
50°
40°
15
20

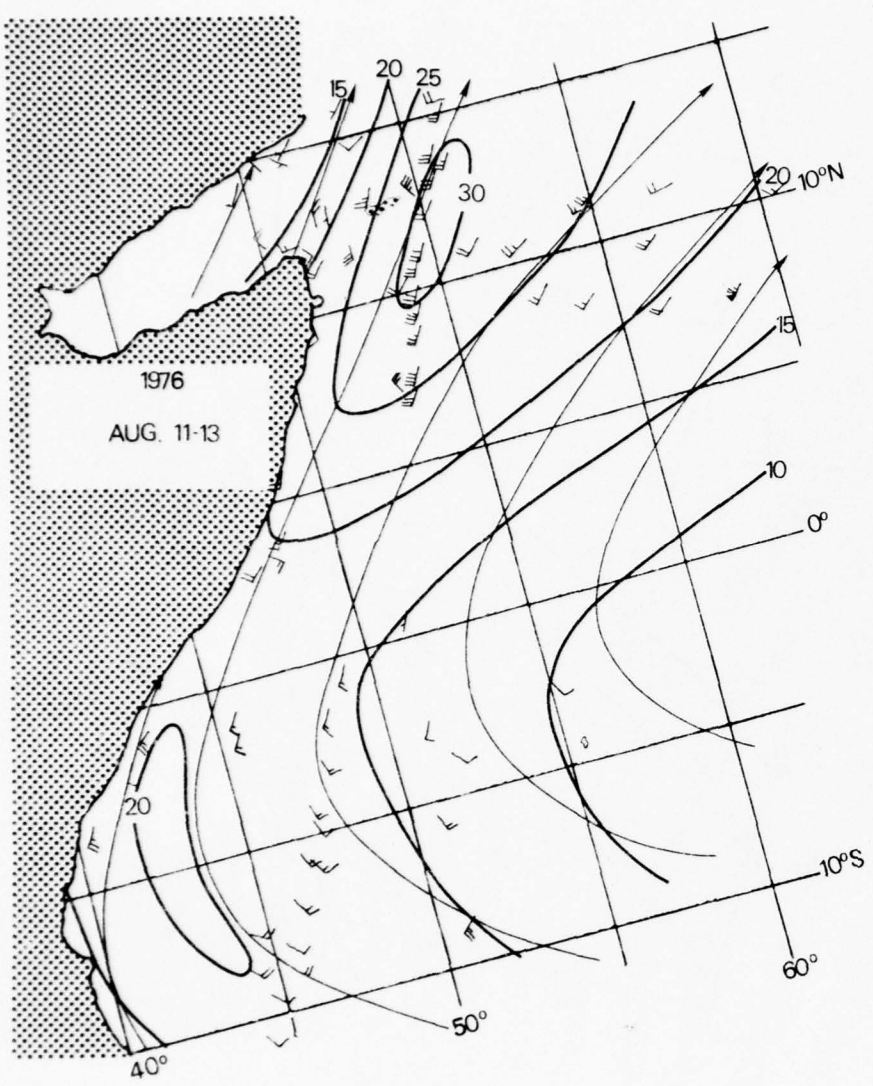

1976
JULY 27-29
20
25
30
20
15
10°
10°N
10°S
60°
50°
40°
15
20

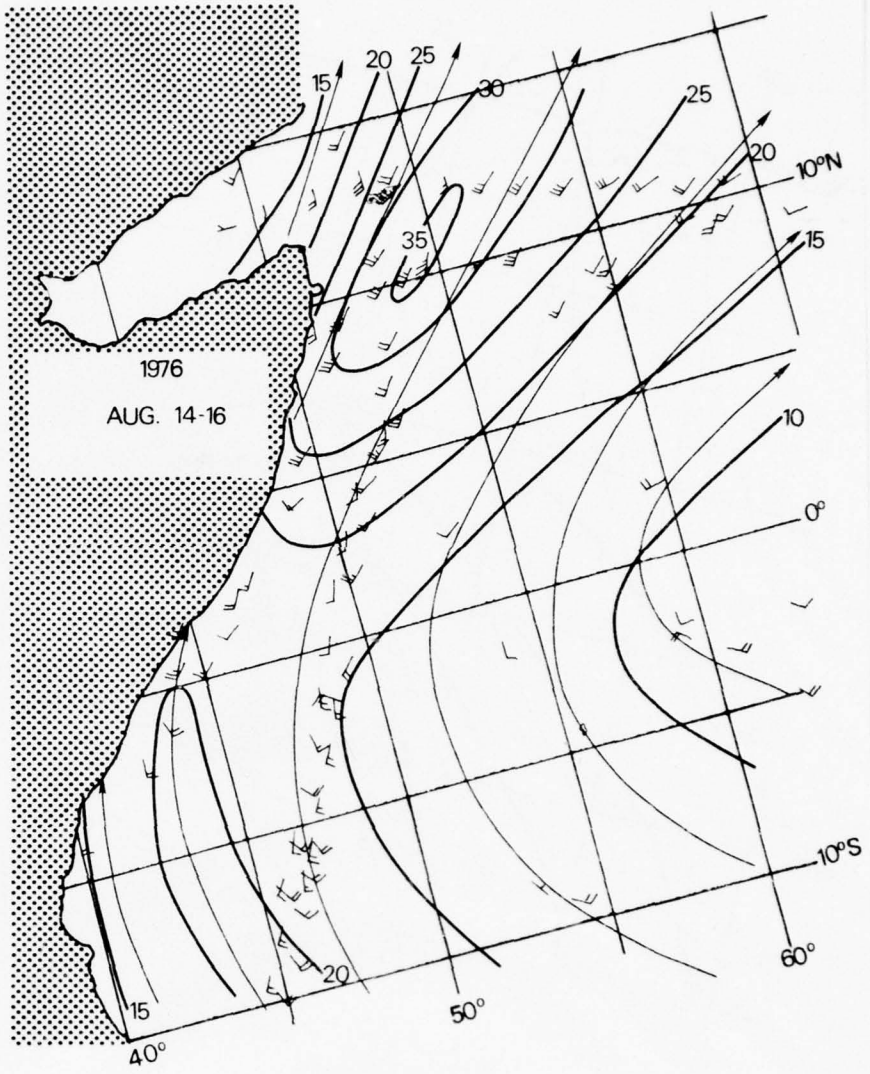

10°N
0°
10°S
60°
50°
40°
AUG. 2-4
1976

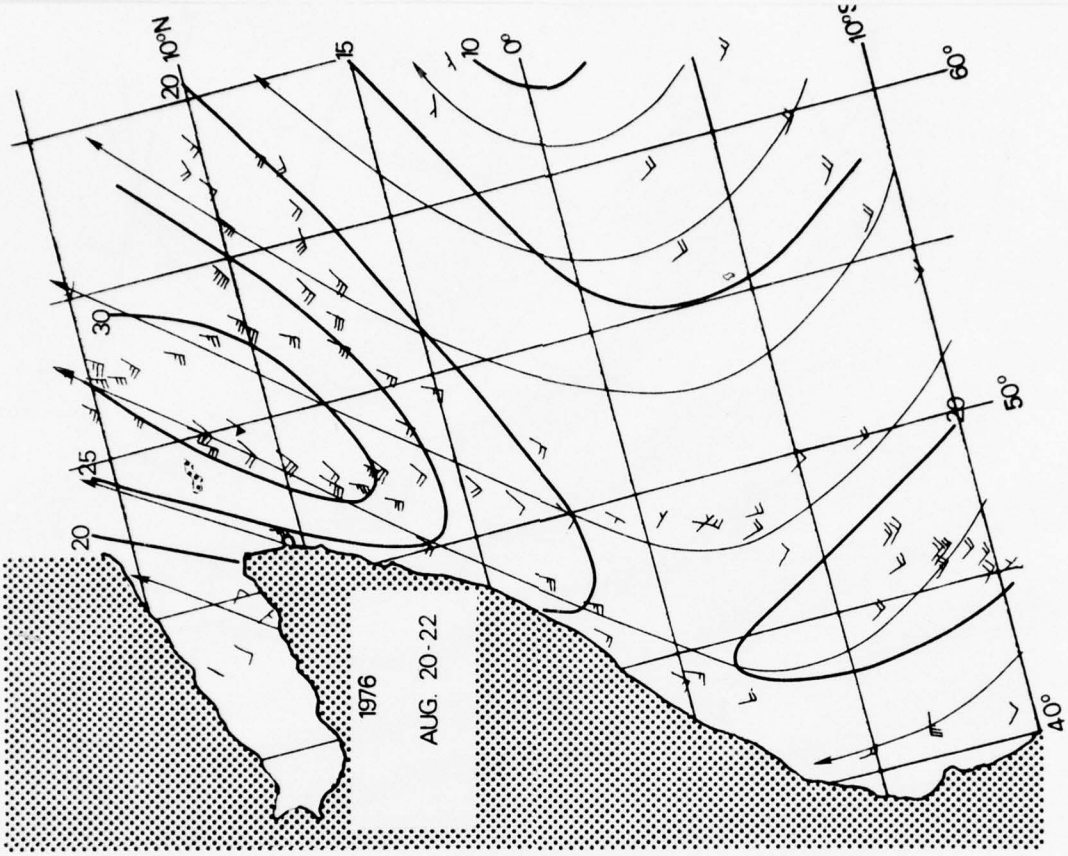

10°N
0°
10°S
60°
50°
40°
JULY 30-AUG 1
1976

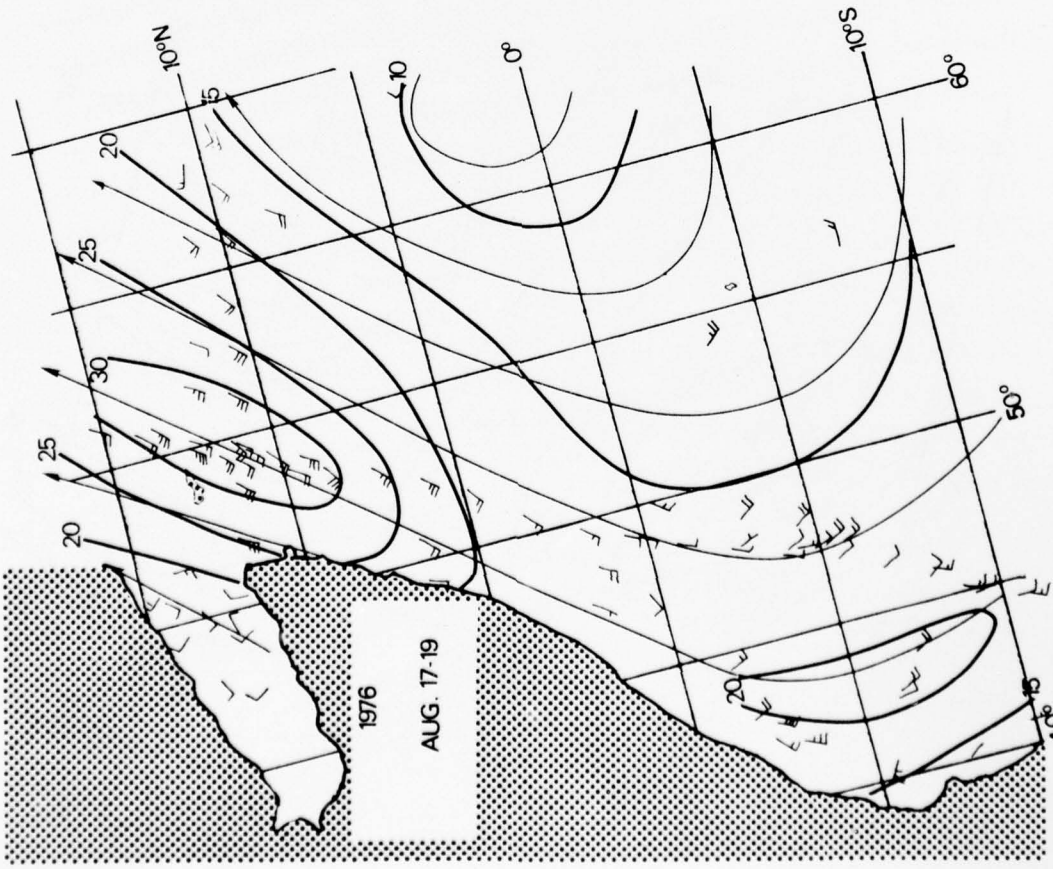

1976
AUG. 5-7
20
25
30
25
20
10°N
15
0°
10
10°S
60°
40°
15
20
50°

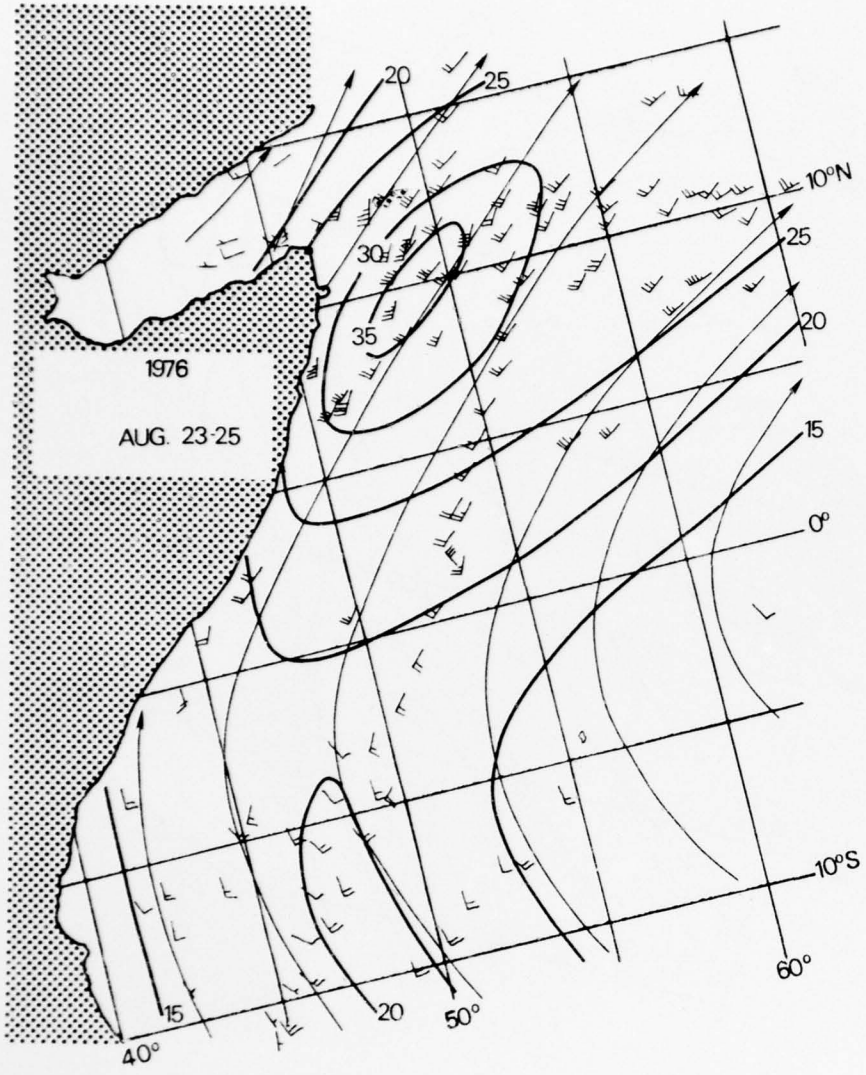

1976
AUG. 8-10
15
20
20
15
10°N
25
10
0°
10°S
60°
40°
50°

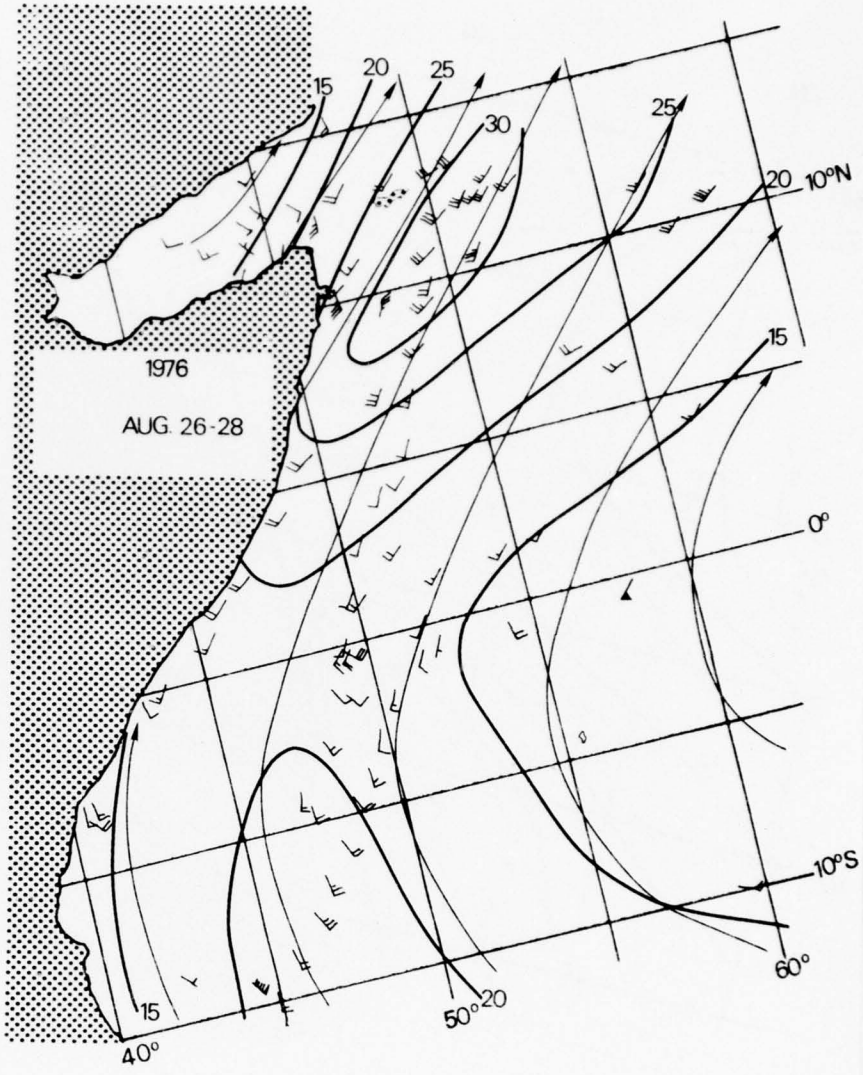

1976
AUG. 11-13
15
20
25
30
20
10°N
15
10
0°
20
10°S
60°
50°
40°

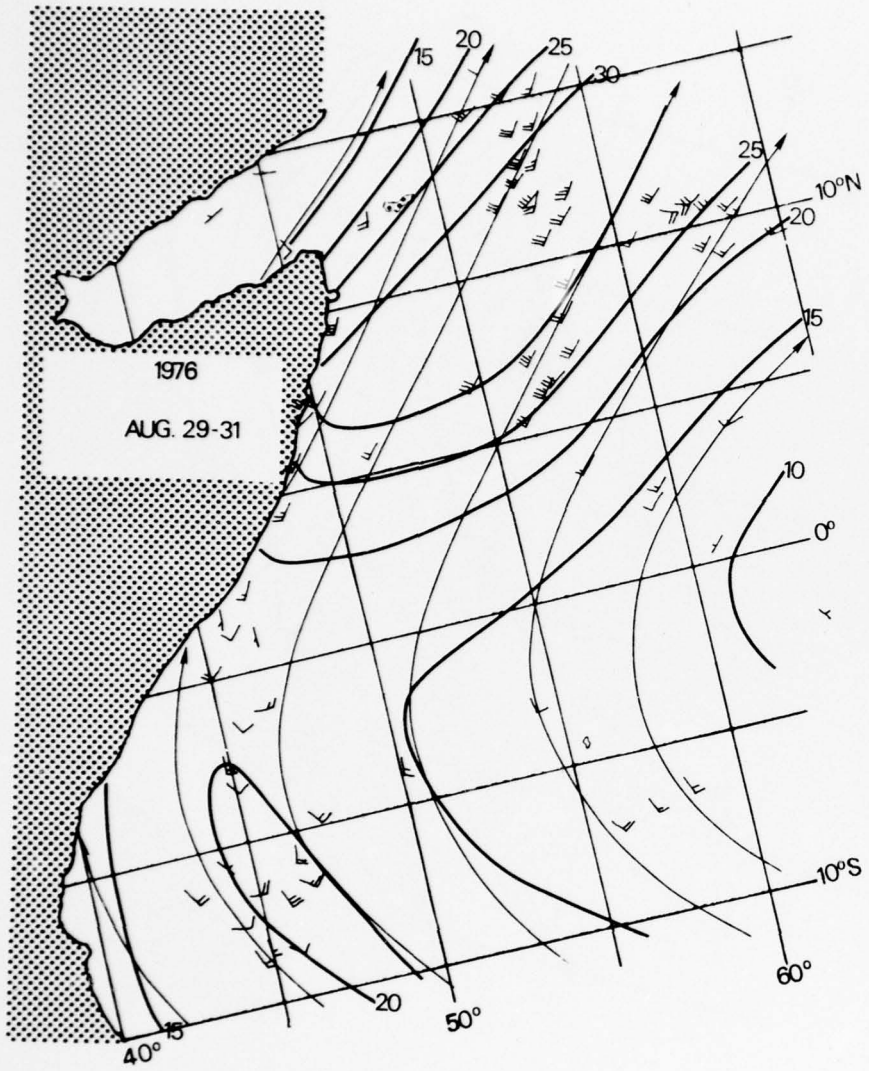

1976
AUG. 14-16
15
20
25
30
25
20
10°N
35
15
10
0°
10°S
60°
15
20
50°
40°

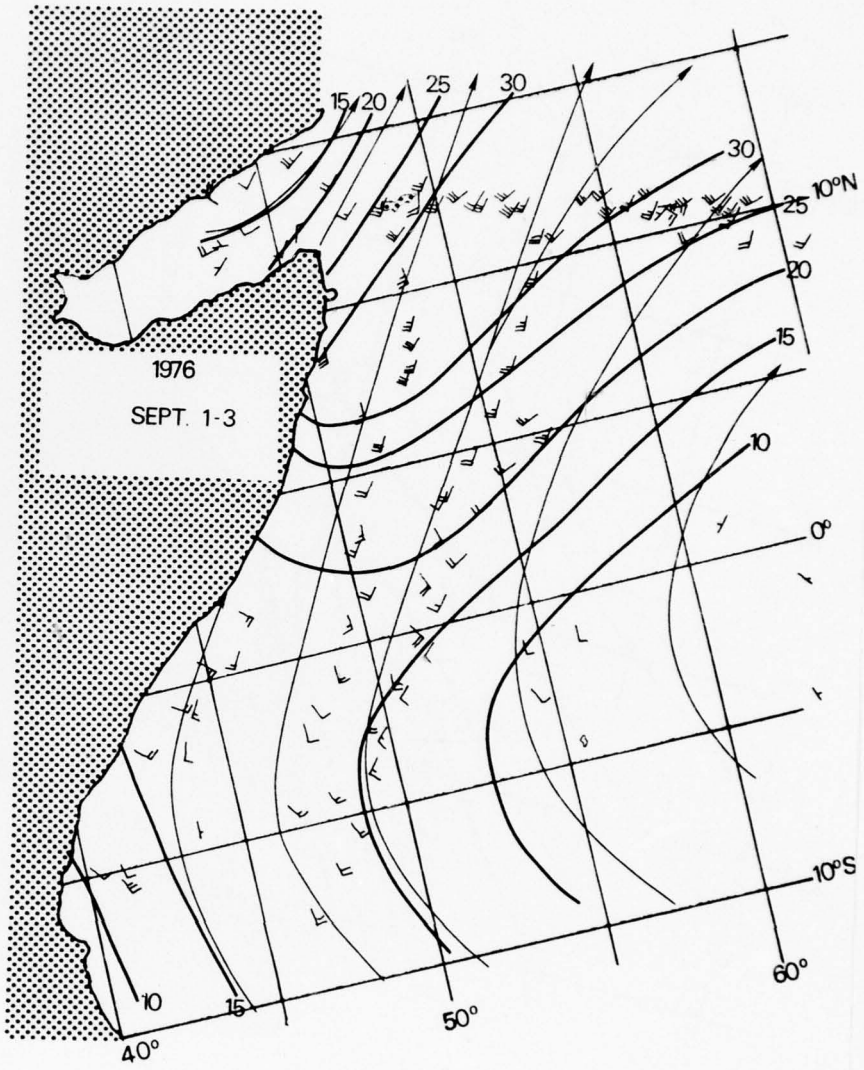

10°N
10°S
60°
50°
40°
0°
10
15
20
25
30
1976
AUG. 20-22

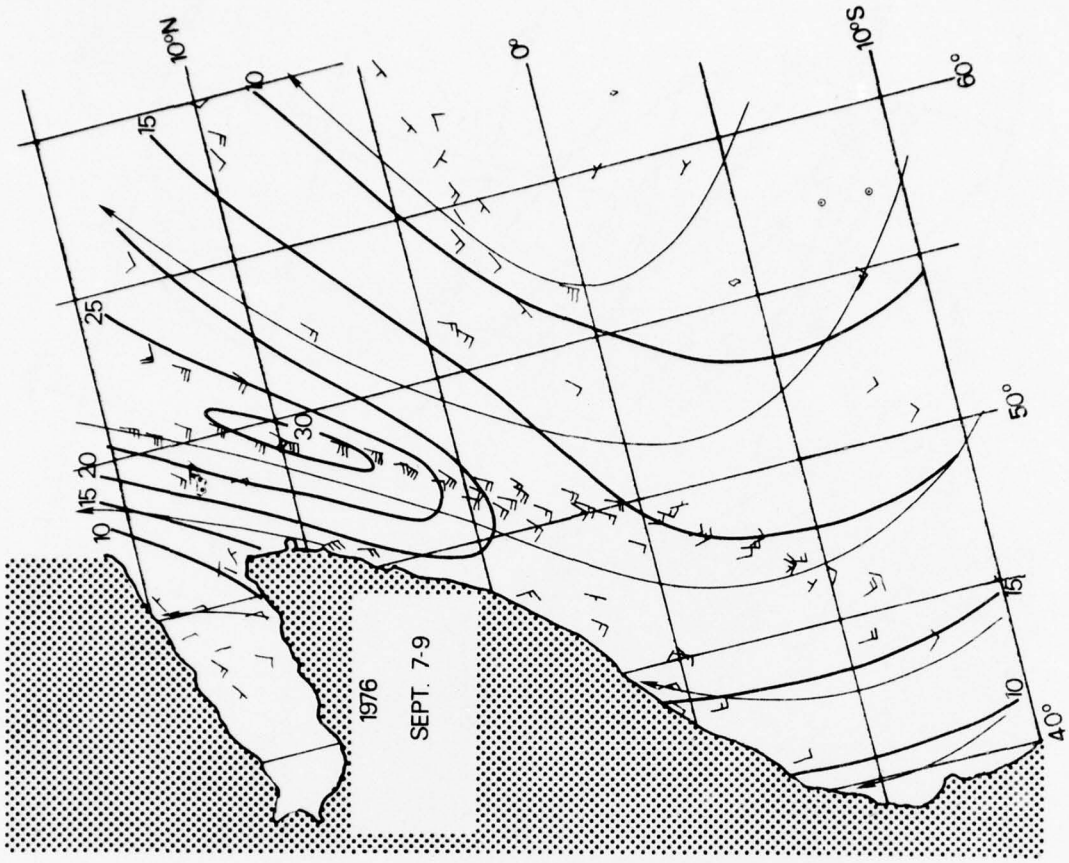

10°N
10°S
60°
50°
40°
0°
10
15
20
25
30
1976
AUG. 17-19

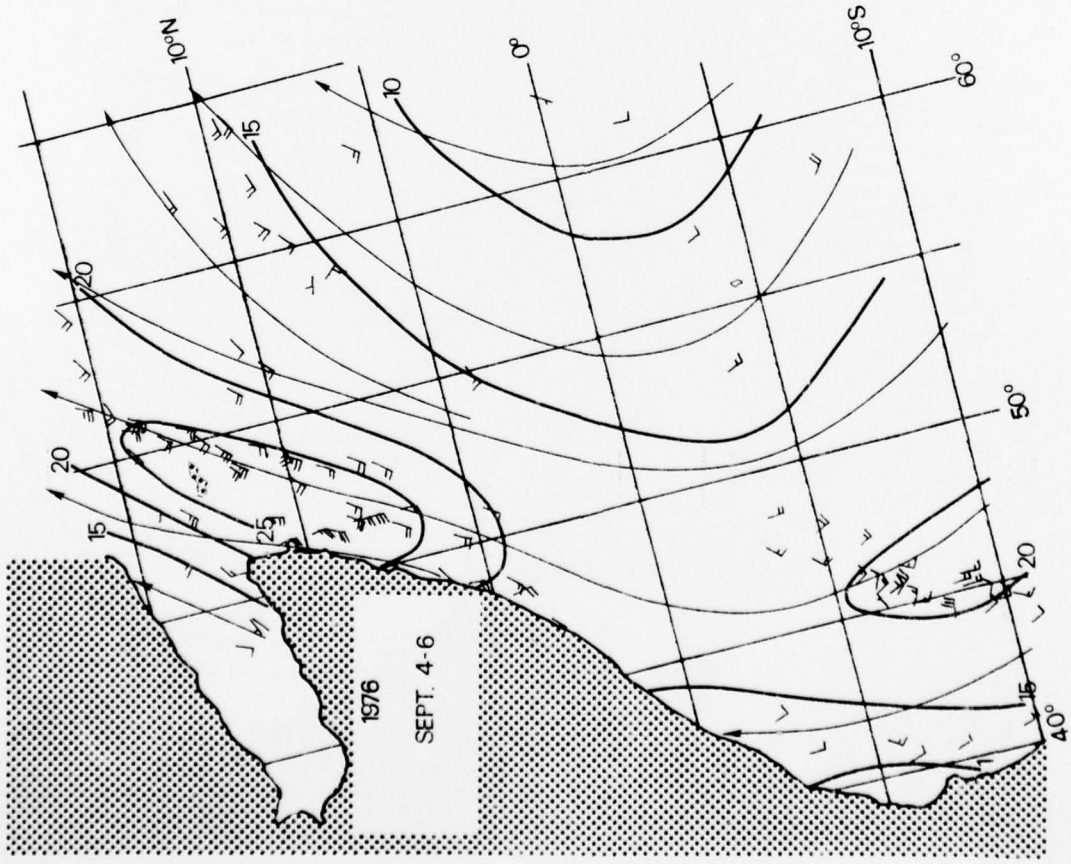

1976
AUG. 23-25
20
25
30
35
10°N
25
20
15
0°
10°S
60°
15
20
50°
40°

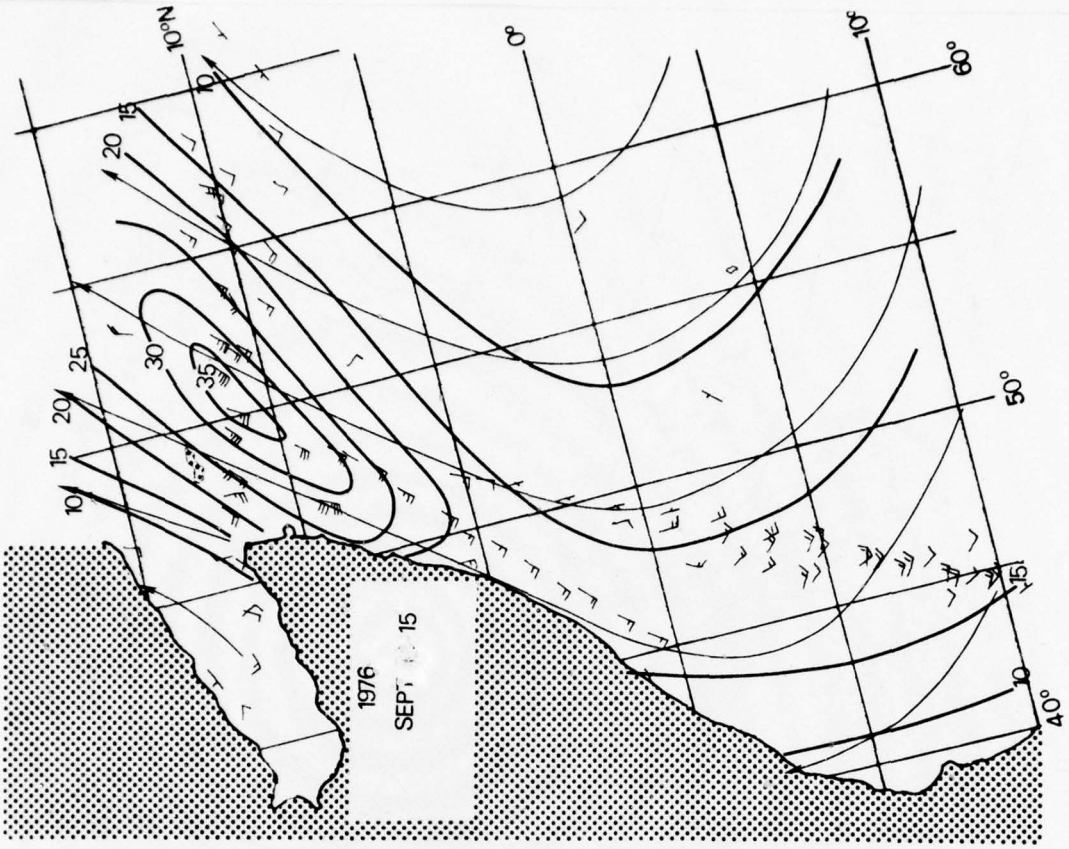

1976
AUG. 26-28
15
20
25
30
25
20
10°N
15
0°
10°S
60°
15
50°
20
40°

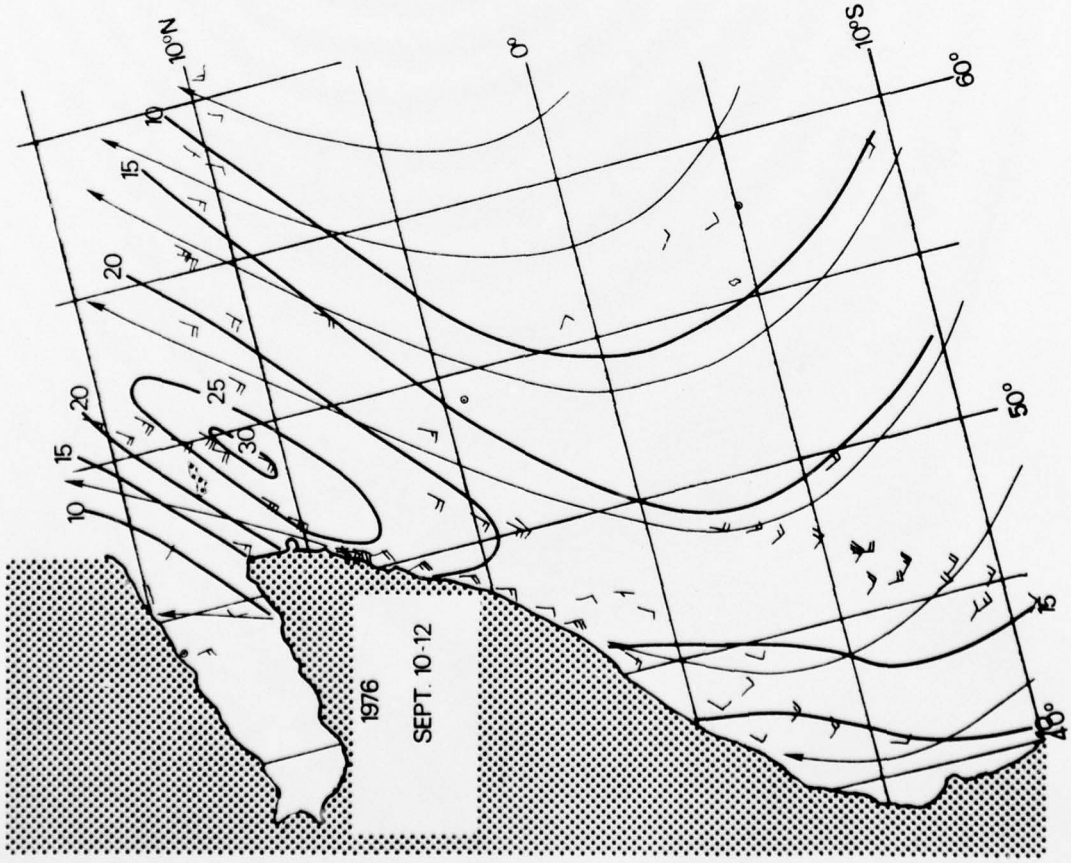

1976
AUG. 29-31
15
20
25
30
25
20
15
10
0°
10°N
10°S
60°
50°
40°
20
15

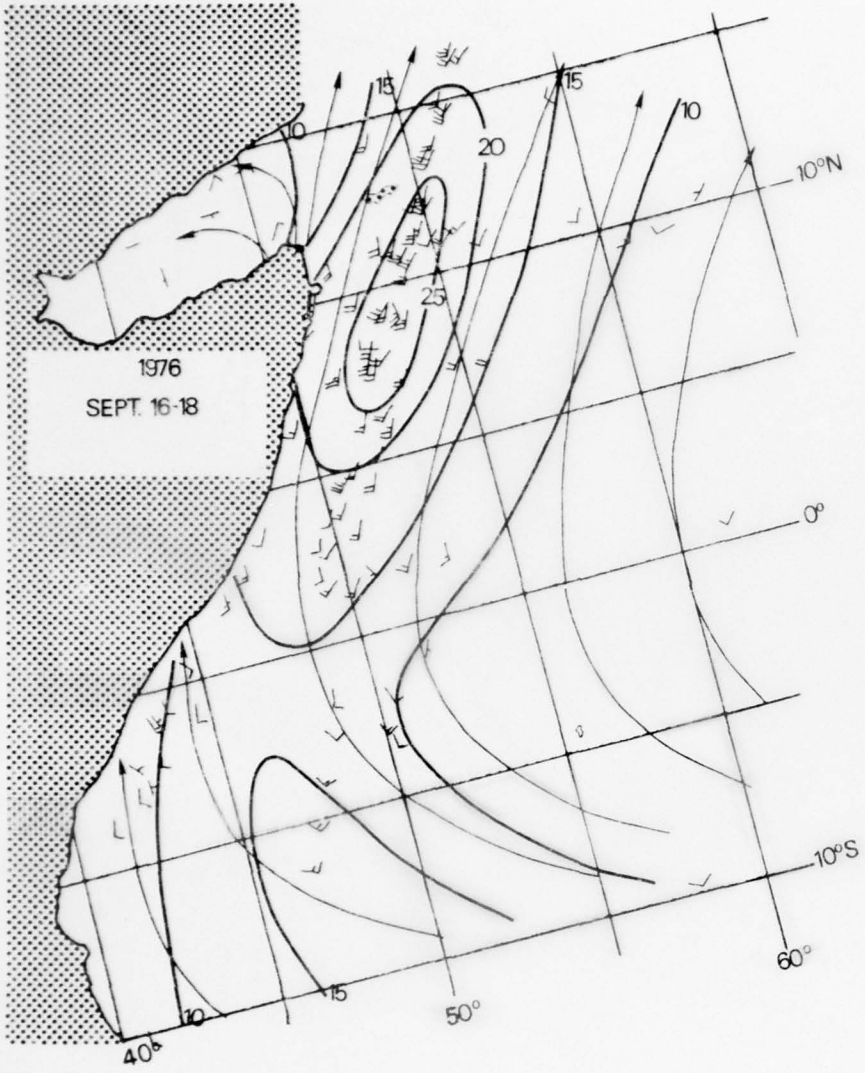

1976
SEPT. 1-3
15
20
25
30
30
25
20
15
10
0°
10°N
10°S
60°
50°
40°
10
15

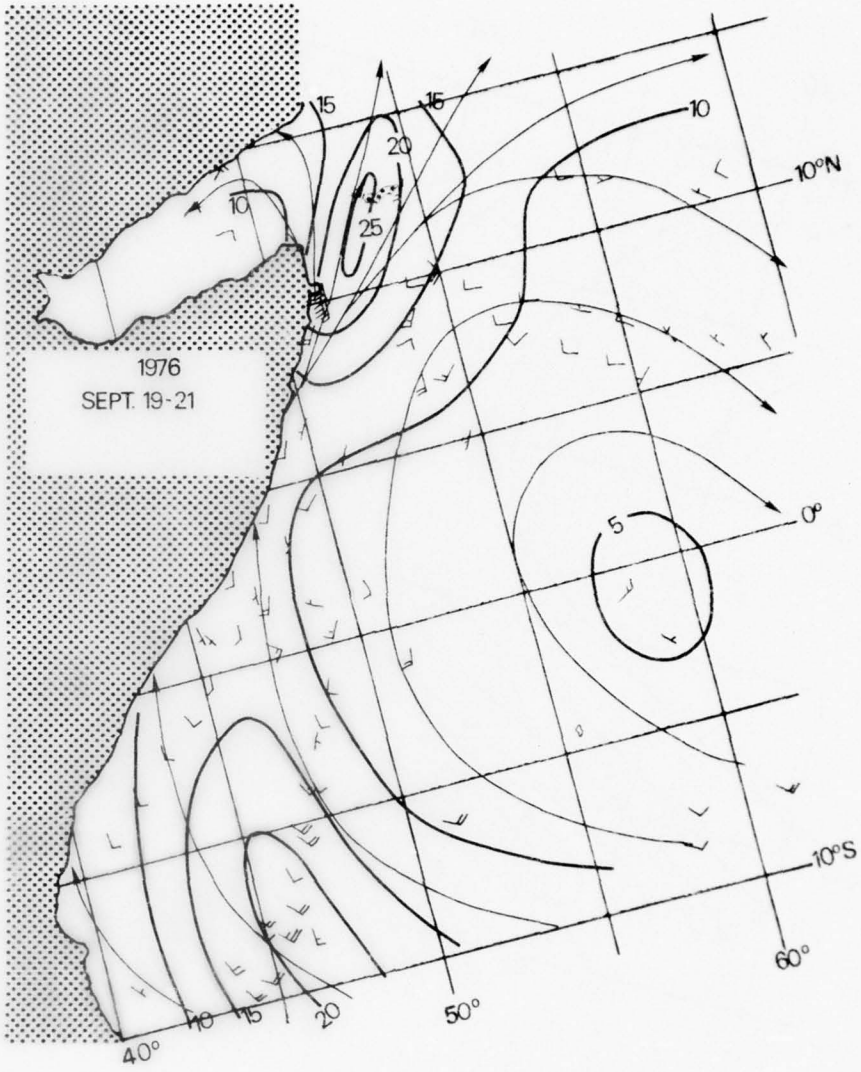

10°N
0°
10°S
60°
50°
40°
10
15
20
25
30
1976
SEPT. 7-9

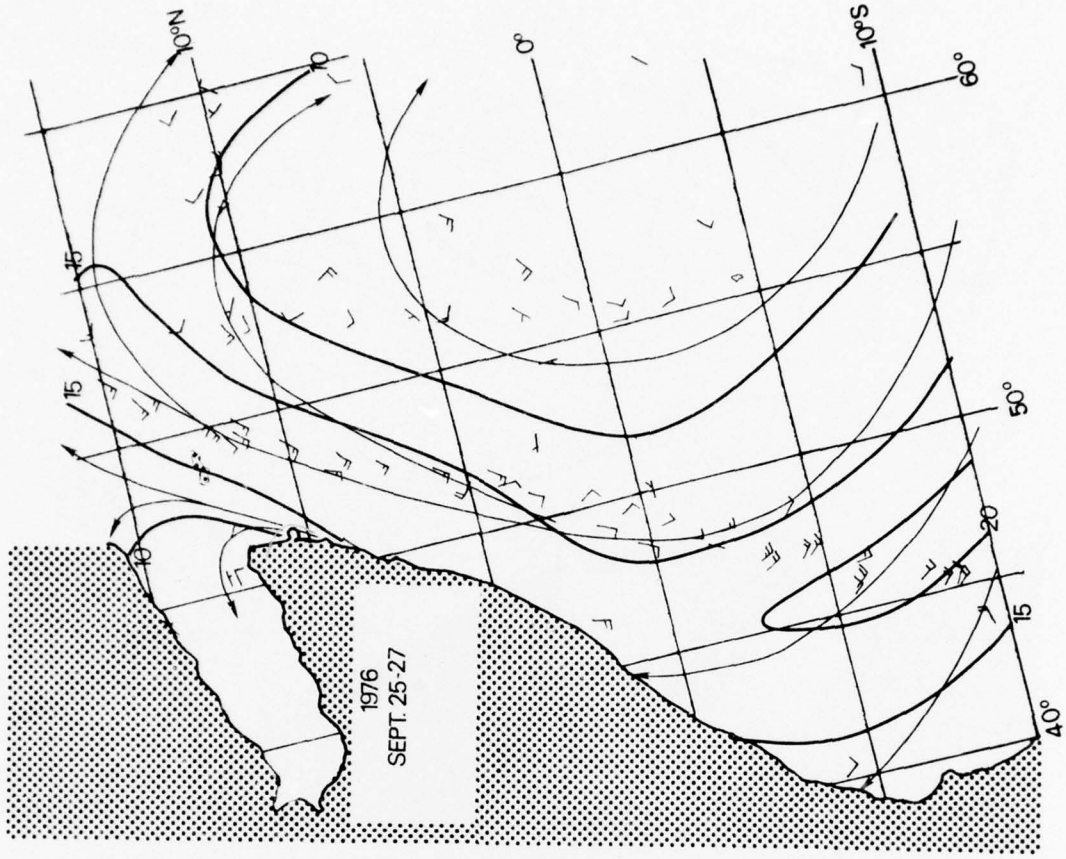

10°N
0°
10°S
60°
50°
40°
10
15
20
25
1976
SEPT. 4-6

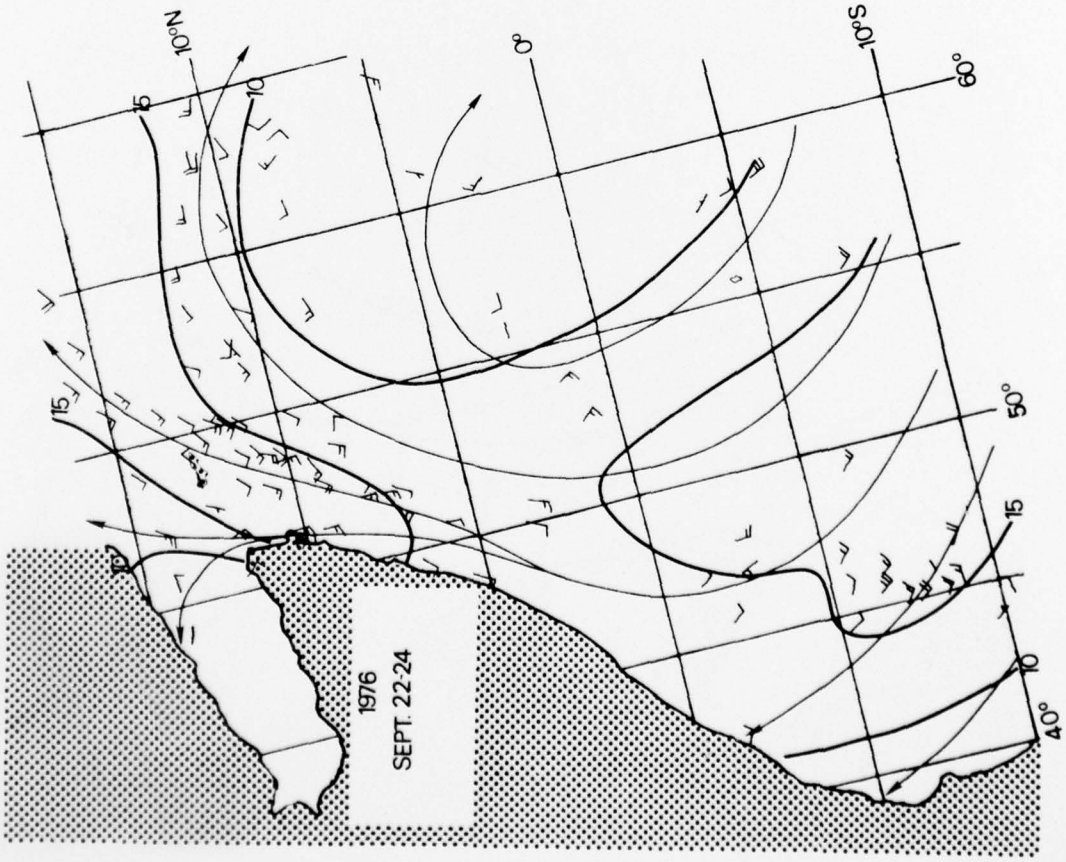

10°N
0°
10°
60°
50°
40°
1976
SEPT. 15

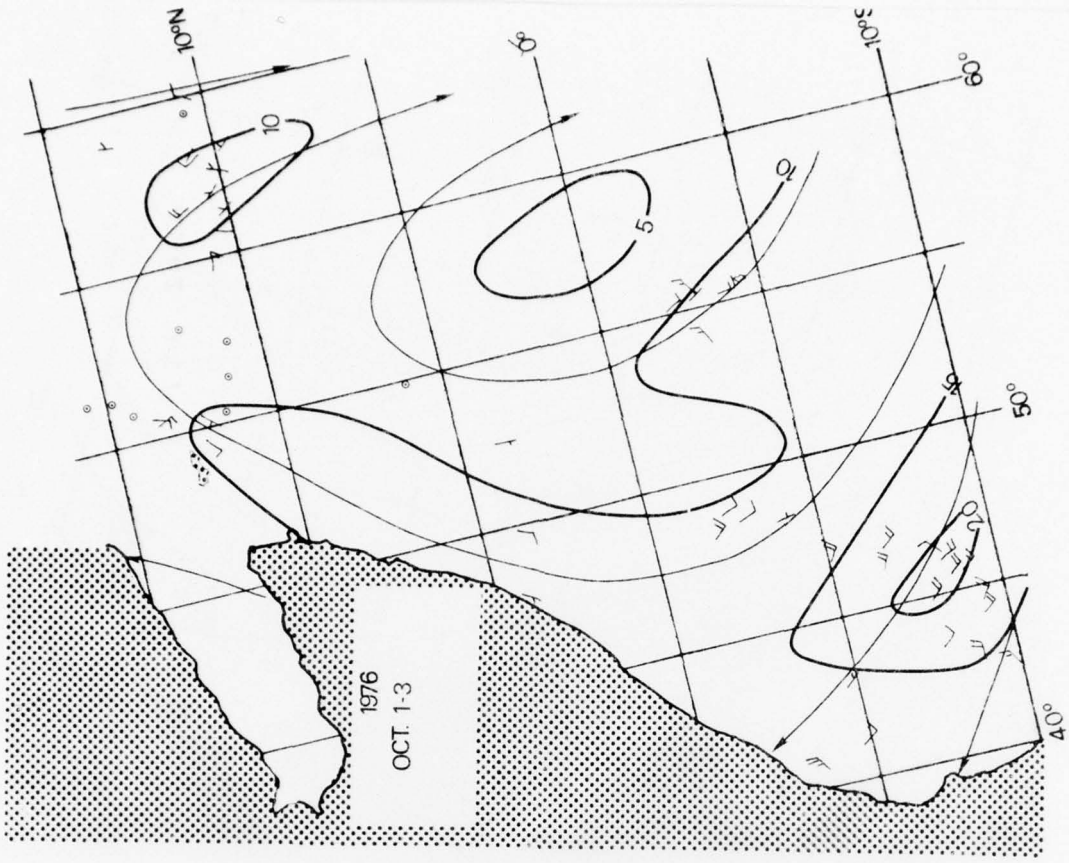

10°N
0°
10°S
60°
50°
40°
1976
SEPT. 10-12

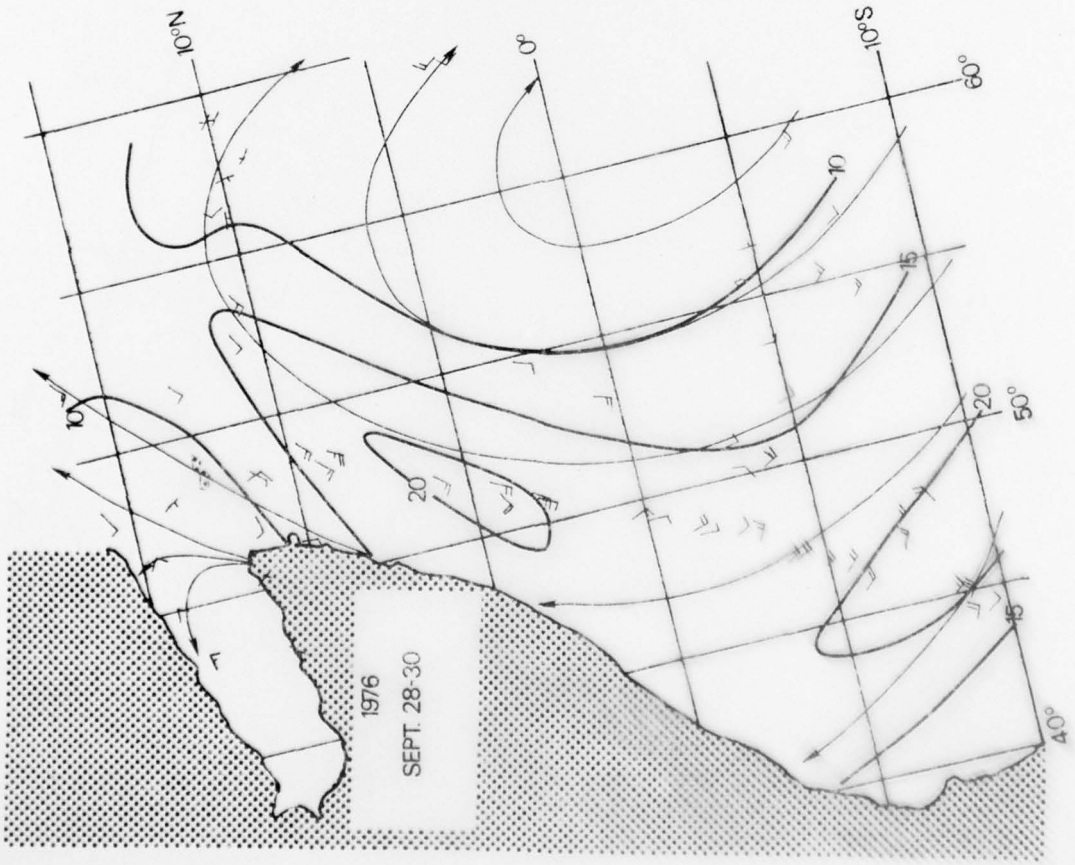

1976
SEPT. 16-18
10
15
20
25
10°N
0°
10°S
40°
50°
60°

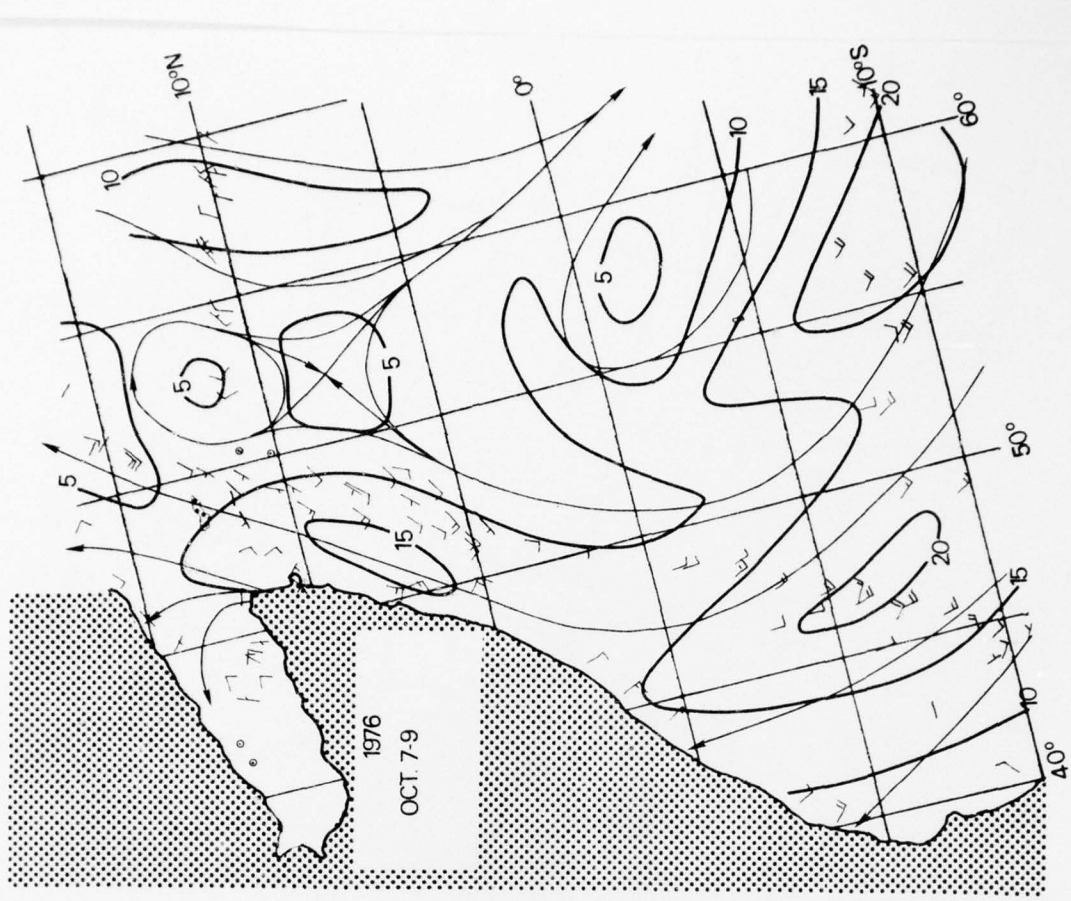

1976
SEPT. 19-21
10
15
20
25
5
10°N
0°
10°S
40°
50°
60°

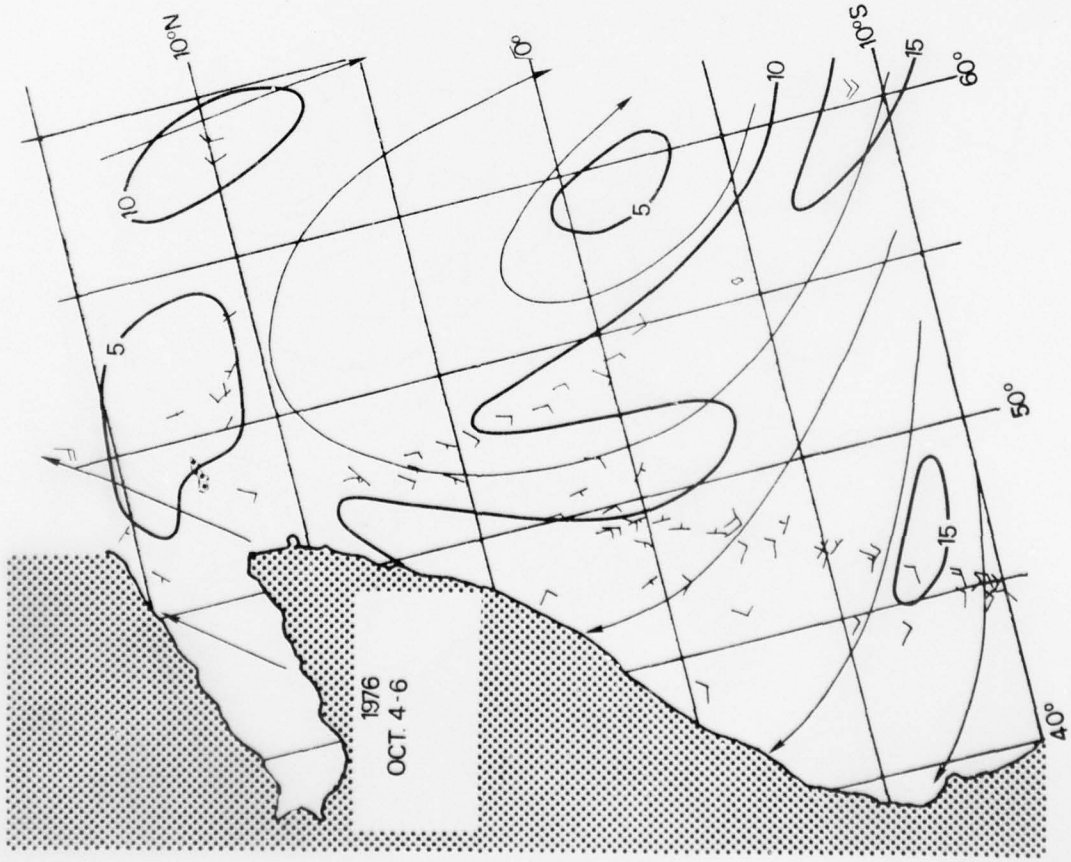

10°N
0°
10°S
60°
50°
40°
15
10
20
1976
SEPT. 25-27

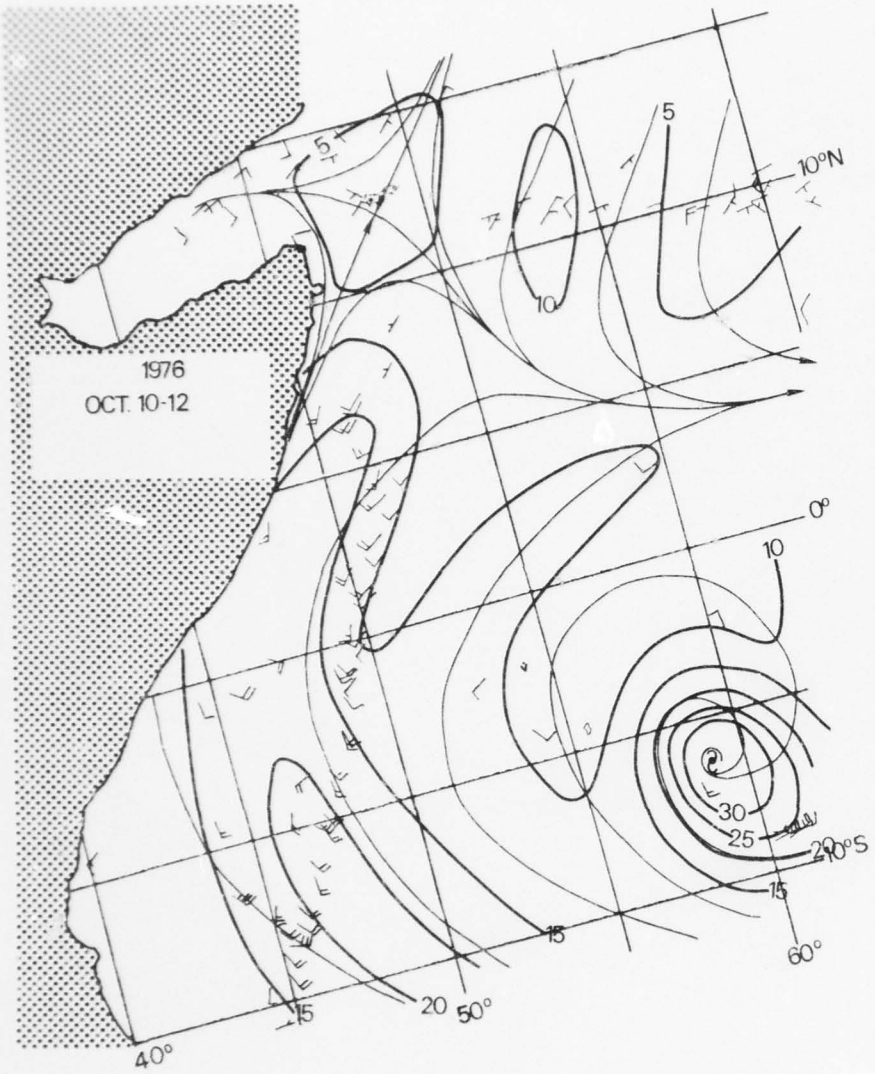

10°N
0°
10°S
60°
50°
40°
15
10
1976
SEPT. 22-24

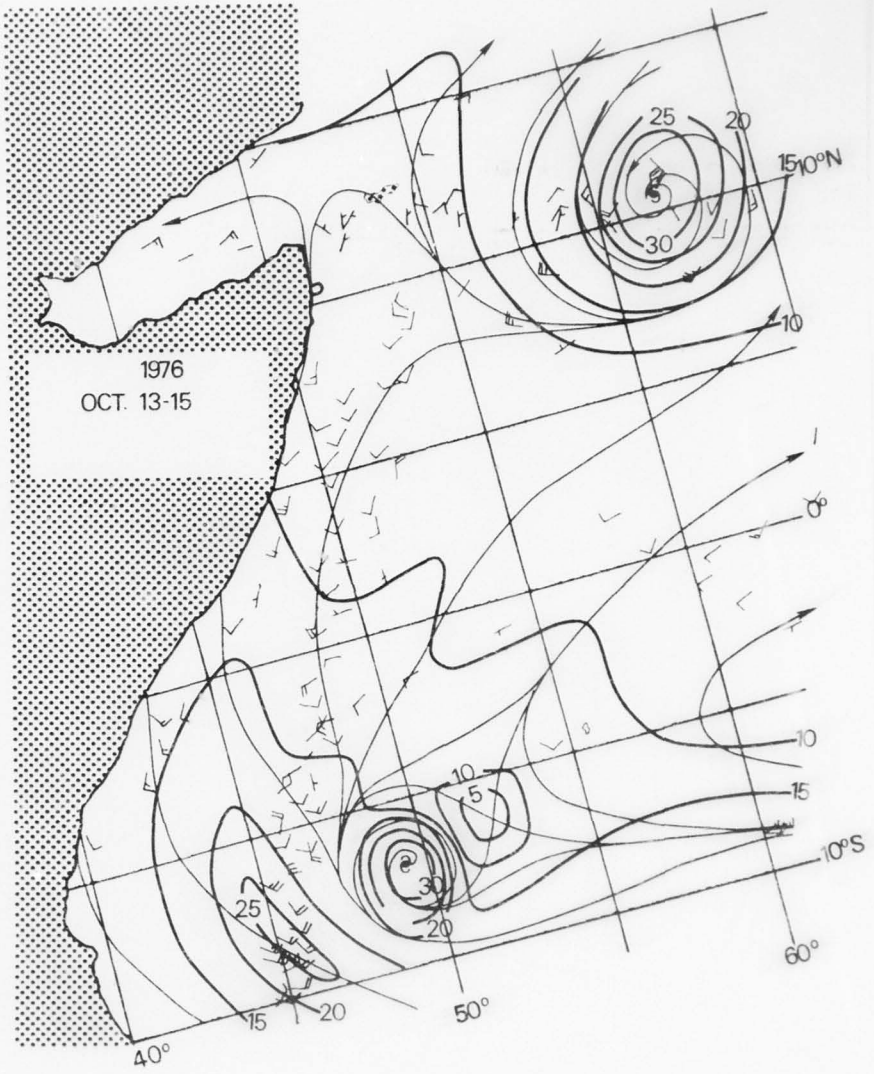

10°N
0°
10°S
60°
50°
40°
10
5
0
1976
OCT. 1-3

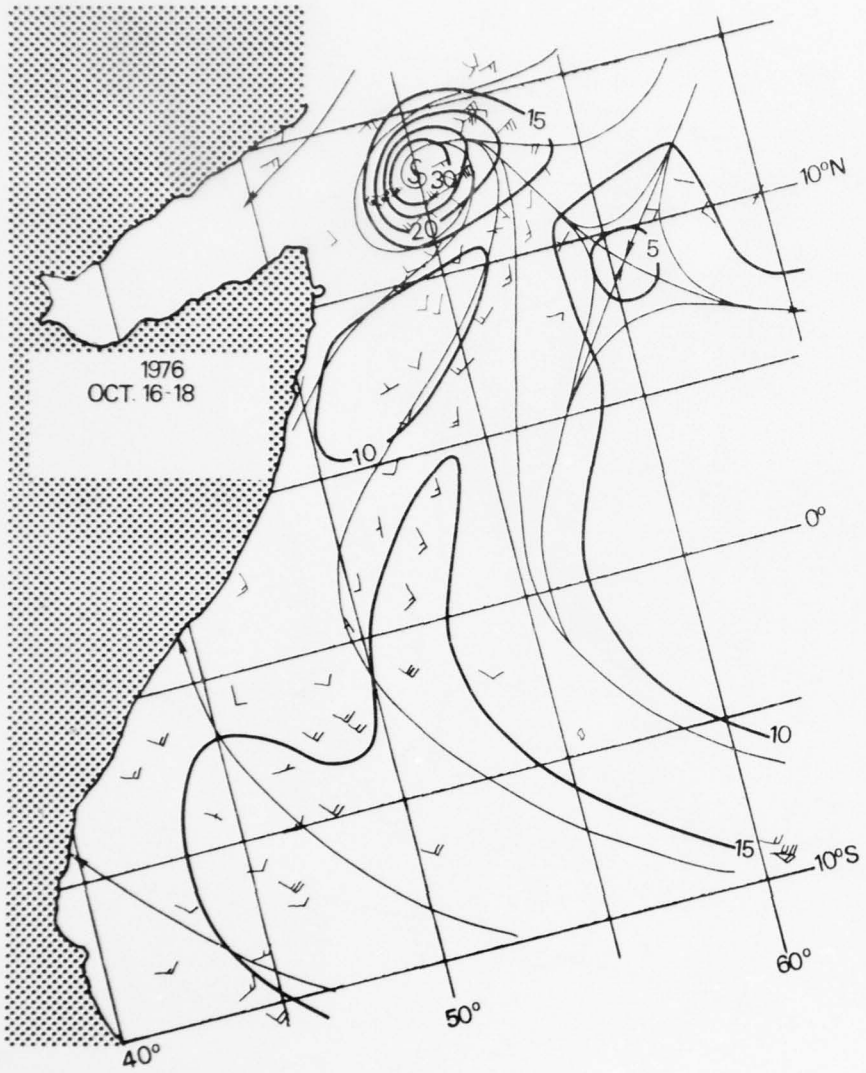

10°N
0°
10°S
60°
50°
40°
10
15
20
1976
SEPT. 28-30

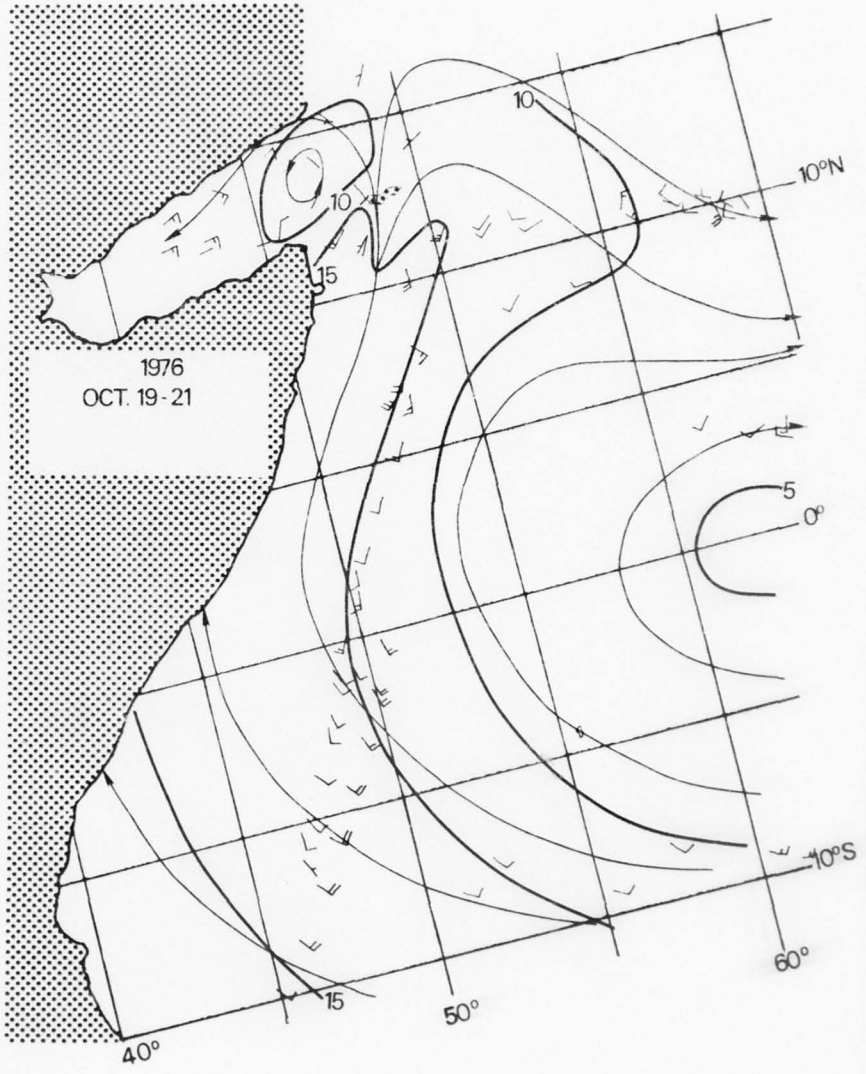

10°N
0°
10°S
60°
50°
40°
5
10
15
20
1976
OCT. 7-9

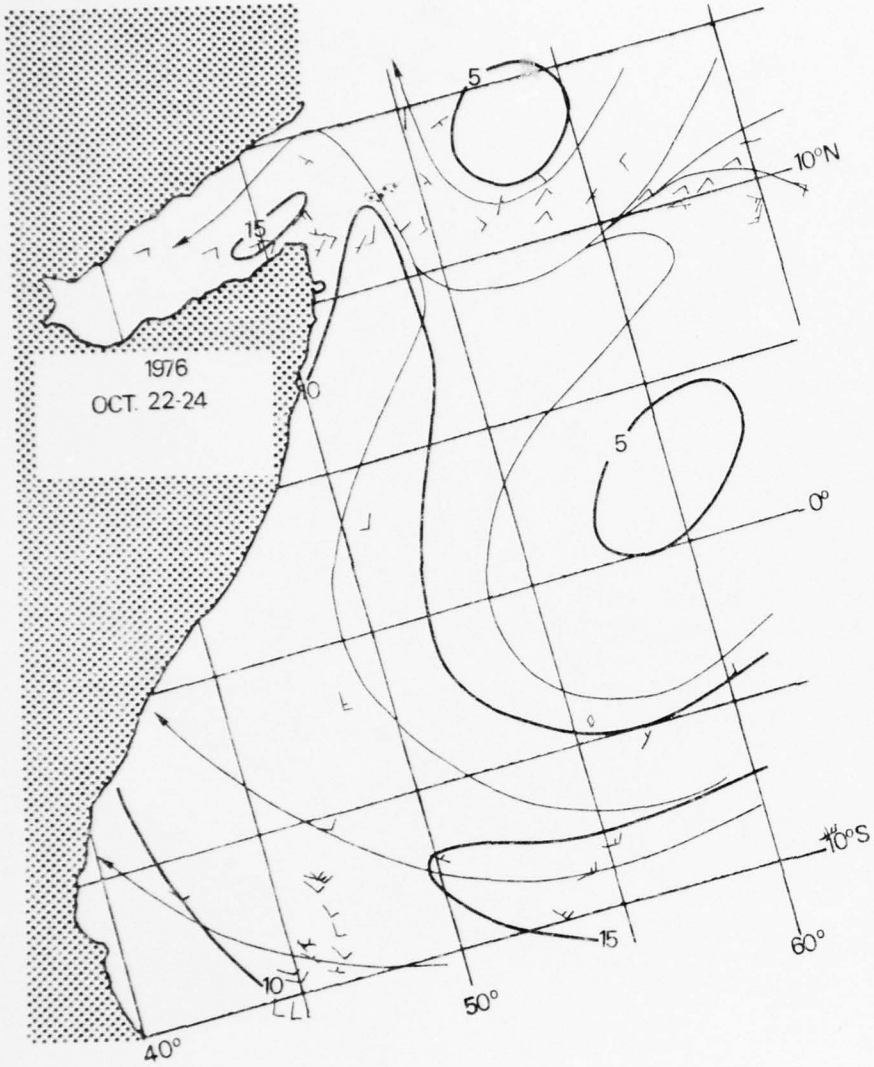

10°N
0°
10°S
60°
50°
40°
5
10
15
1976
OCT. 4-6

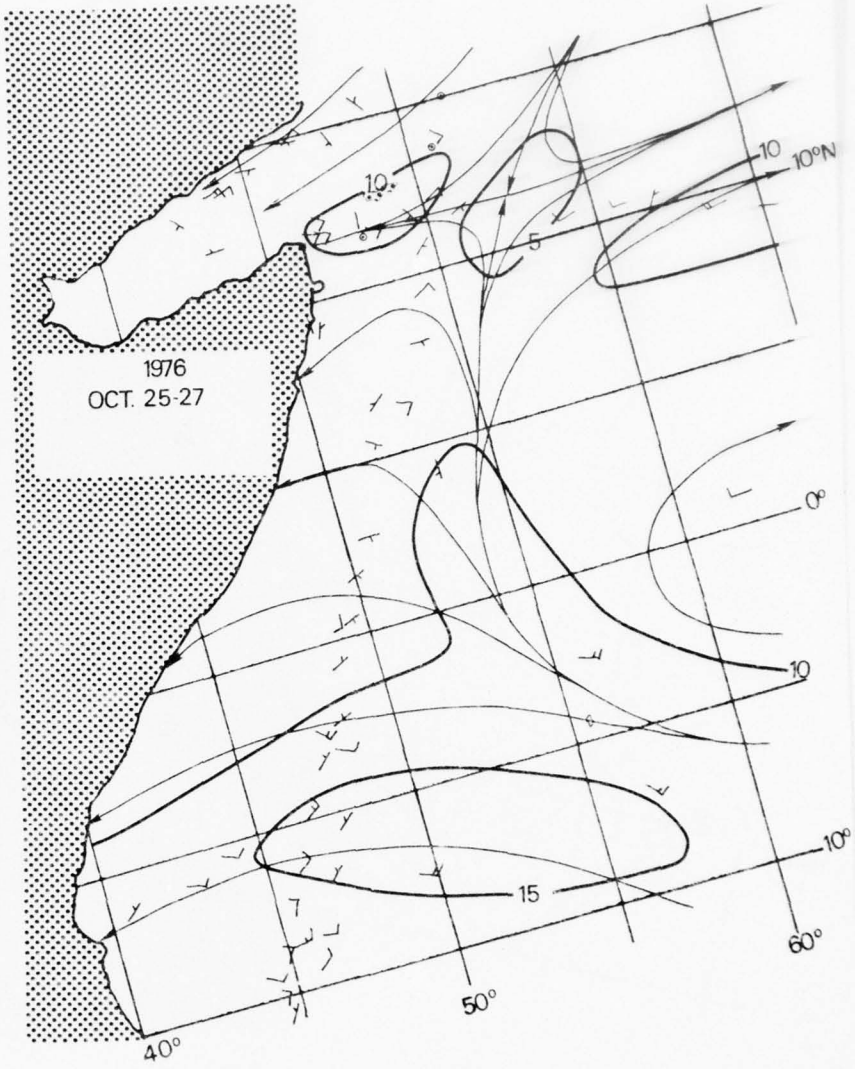

1976
OCT. 10-12
10°N
0°
10°S
40°
50°
60°
5
10
15
20
25
30

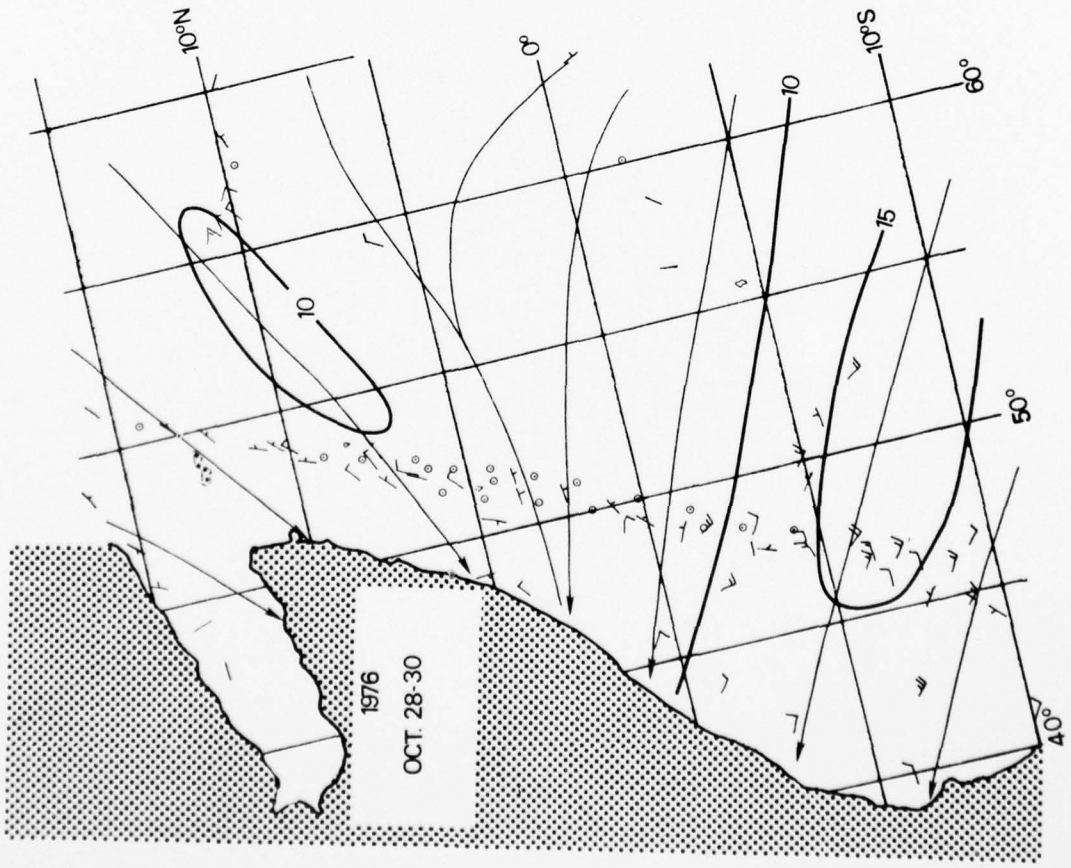

1976
OCT. 13-15
10°N
0°
10°S
40°
50°
60°
5
10
15
20
25
30


1976
OCT. 16-18
15
30
20
10
5
10°N
0°
10
15
10°S
60°
50°
40°


1976
OCT. 19-21
10
10
15
10°N
5
0°
10°S
60°
15
50°
40°


1976
OCT. 22-24
5
15
10
5
10°N
0°
10°S
15
10
40°
50°
60°


1976
OCT. 25-27
10
10
5
10°N
0°
10
10°
15
40°
50°
60°


10°N
0°
10°S
60°
50°
40°
10
15
10
1976
OCT. 28-30

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

| REPORT DOCUMENTATION PAGE | | READ INSTRUCTIONS BEFORE COMPLETING FORM |
|---|---|---|
| 1. REPORT NUMBER<br>NO. N00014-75-C-0173 | 2. GOVT ACCESSION NO. | 3. RECIPIENT'S CATALOG NUMBER |
| 4. TITLE (and Subtitle)<br>SURFACE WIND MAPS FOR THE WESTERN INDIAN OCEAN FROM AUGUST 1975 TO OCTOBER 26 | | 5. TYPE OF REPORT & PERIOD COVERED<br>Technical Report 1975-76<br>6. PERFORMING ORG. REPORT NUMBER |
| 7. AUTHOR(s)<br>Jose-Fernandez Partagas & Walter Düing | | 8. CONTRACT OR GRANT NUMBER(s)<br>N00014-75-C-0173 ✓ |
| 9. PERFORMING ORGANIZATION NAME AND ADDRESS<br>Rosenstiel School of Marine & Atmospheric Sciences ✓<br>4600 Rickenbacker Cswy.<br>Miami, Fla. 33149 | | 10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS<br>NA |
| 11. CONTROLLING OFFICE NAME AND ADDRESS<br>CDR. Robert G. Kirk, Code 410<br>Department of the Navy<br>Naval Ocean. Research & Development Activity | | 12. REPORT DATE<br>NOVEMBER 1977<br>13. NUMBER OF PAGES<br>51 |
| 14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)<br>Bay St. Louis Mississippi 39520 | | 15. SECURITY CLASS. (of this report)<br>NA<br>15a. DECLASSIFICATION/DOWNGRADING SCHEDULE NA |

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Wind maps; western Indian Ocean; wind data; atmospheric jet; surface wind field; SW Monsoon

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

During the past few years, oceanographers and meteorologists alike have refocused their interest on the monsoon regions of the western Indian Ocean. Oceanographic pilot programs (e.g. INDEX, CINCWIO) and meteorological programs (e.g. MONEX, FGGE) are evidences of this interest.

The interaction between ocean and atmosphere is particularly pronounced in the Arabian Sea and along its boundaries. The low-level atmospheric jet over East →

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE
S/N 0102-014-6601

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Africa and the Somali Current with its adjacent upwelling areas are prime examples of coupled air-sea phenomena. The large signals and the annual periodicity of these processes make them particularly attractive to the geophysical researchers, especially to oceanographers and meteorologists.

As part of studying the influence of atmospheric motions on oceanic motions in the western Indian Ocean, maps describing the surface wind field for that area have been prepared at the University of Miami for a period of fourteen and a half months (mid-August 1975 to October 1976). The surface wind description given by these maps is more suitable for concurrent oceanographic studies than monthly mean winds obtained from climatological atlases: year-to-year variations and high horizontal resolution, which are averaged out in the atlas information, are retained on our maps.

For meteorologists and oceanographers preparing experimental work in 1979, these maps may be of particular interest.